DAVID EVANS
AND ASSOCIATES INC.

MEMORANDUM

DATE: March 5, 2019

TO: Jed Ireland
City of Sammamish Public Works
801 228th Avenue SE
Sammamish, WA 98075

FROM: Josh Anderson, PE, PTOE and Kyle Bright, EIT
David Evans and Associates, Inc.

SUBJECT: Issaquah-Pine Lake Road Traffic Analysis

PROJECT: COSA 00000024
Issaquah-Pine Lake Road SE Improvements Ph 1, SE 32nd Way to SE Klahanie Boulevard Project

CC: File

1.0 INTRODUCTION

The purpose of this memorandum is to summarize the traffic operations of the Issaquah-Pine Lake Road (IPLR) SE segment between SE 32nd Way and SE Klahanie Boulevard. The memorandum informs the selection of a preferred roadway improvement alternative for the segment.

2.0 PURPOSE AND NEED FOR THE PROJECT

Issaquah-Pine Lake Road SE connects areas in south Sammamish and north and central Issaquah to areas to the north, including the City of Sammamish areas of Klahanie, Pine Lake, and Beaver Lake. To the south, Highlands Drive NE changes to Issaquah-Pine Lake Road when it crosses Issaquah Fall City Road. To the north, Issaquah-Pine Lake Road terminates at 228th Avenue SE, a major north-south arterial extending through the majority of the City.

The project is needed due to increases in traffic volumes and related congestion, delays, lack of mobility, and safety issues in the area. Nearby new development in the last decade has increased residential density as well as through traffic. The improvements as part of this project are designed to increase capacity and mobility, decrease delay and congestion, and improve motorized and nonmotorized user's safety through the project limits.

3.0 ANALYSIS MODELS

The following analysis shares similarities with the Concurrency Program, but goes into more detail and has a longer time horizon. The Concurrency Program analysis looks ahead six years consistent with the Six-Year Transportation Improvement Plan (TIP), whereas this more detailed analysis looks ahead to the forecast year of 2035. This more detailed analysis post-processes new 2018 traffic counts through the

use of the City's most current 2035 Traffic Demand Model, which is derived from the 2012 traffic model. The AM and PM peak hours were calculated from the 2018 counts and were 8:00 to 9:00 AM and 5:00 to 6:00 PM respectively. The following models were used for the operational analysis of the corridor.

3.1 SYNCHRO

The Synchro software is based upon procedures outlined in the 2000 and 2010 Highway Capacity Manuals (HCM) for intersections and arterials and explicitly evaluates traffic operations under a coordinated system of signalized intersections. It also calculates traffic arrival types, calculates right-turn-on-red capacity, and determines average and maximum expected queue lengths.

The Synchro analysis software was selected to perform the intersection analysis as it can provide the delay and LOS output of an HCM analysis and consider the systematic interaction of the intersections regarding queuing and delays. HCM 2010 methodology was used for signalized and unsignalized intersections where two-stage left turns are not present. HCM 2000 procedures were used at unsignalized intersections were two stage left-turns are present. Synchro models for existing (2018), no build, and build were created to analyze intersection level delay and LOS to compare to City operational standards for AM and PM time periods. The Synchro model was comprised of the IPLR study area with additional intersections at SE 47th Way and 230th Ln SE.

3.2 SIDRA

Sidra was used to analyze roundabouts for intersection level delay and LOS to compare to City operational standards. For existing, no build, and build conditions, the roundabout at SE 32nd Way was analyzed. A roundabout was also analyzed at Klahanie Blvd as a build option.

3.3 VISSIM

Microsimulation models were created in VISSIM for existing, no build, and build conditions to measure and quantify driver experience. Before the analysis could begin, the VISSIM models were calibrated for local conditions. For the calibration, traffic volumes, lane configurations, lane utilization, signal timing, and driver behavior were adjusted from the default settings. This was done to allow the simulation model to replicate local volumes, and queuing and travel time observations. The model was then run for 90 minutes (7:30 to 9:00) in the AM and 75 minutes (4:45 to 6:00) in the PM peak periods. The AM model is longer than the PM model to capture the impact of the Pine Lake Middle School speed zone that occurs between 7:45 and 8:15 AM as well as the period with the highest volume.

The simulation was conducted with a volume peaking profile that was obtained from the turning movement counts to replicate the peaking traffic patterns that were observed in the field. Instead of using one set of volumes for the peak hour and assuming the vehicles arrive evenly spread throughout the hour, a separate volume set was created for each 15-minute interval. This allows for a more detailed simulation of short events such as school drop-offs or pick-ups. Turning speeds and headway factors were adjusted and the models were re-simulated and, once again, compared to the field observations. This process was repeated until the model queue lengths were visually comparable to the actual field observations. Once this visual level of calibration was gained, volume throughputs and field collected travel times were summarized from the simulations and compared to actual field collected data.

GEH Statistic:

$$GEH = \sqrt{\frac{2(v-C)^2}{v-C}}$$

v = Model Volume
C = Counted Volume

To confirm volume calibration, the industry uses a statistic called the GEH statistic. The formula for GEH is shown in the box to the right. The goal is to calculate a GEH statistic for each turning movement in the model and have 85 percent of the GEH statistics below 5. If the GEH is between 5 and 10, additional investigation should be conducted, and if the value is above 10, there is a high probability that either the counted volume, or the modeled volume is inaccurate.

The existing models were calibrated to where the GEH statistic for 100 percent of the turning movement volumes was below 2.5. To confirm travel time calibration, the field collected travel times were compared to the modeled travel times. Travel time calibration is not as complicated as volume calibration. The industry standard for travel time calibration is to have the modeled travel times within ten percent of the observed travel times. The morning and evening model travel times were within six percent of the observed travel times.

4.0 EXISTING CONDITIONS

This section summarizes the existing (2018) conditions on IPLR. Volumes used in the analysis of the existing conditions were collected at the onset of the project in 2018. Synchro was used to analyze the signalized and unsignalized intersections. Sidra was used to analyze the roundabout at SE 32nd Way. VISSIM was used to identify queuing deficiencies.

4.1 Traffic Volumes

The turning movement traffic counts were collected at study area intersections on May 17th of 2018 between 7:00 and 9:00 AM and 4:00 and 6:00PM. Directional tube counts were collected for the 48 hours of May 16th and 17th of 2018. The traffic counts are included as **Appendix A.**

The turning movement volumes for the AM and PM peak hours are shown in **Figure 1**. The morning peak hour occurred between 8:00 and 9:00 AM while the afternoon peak hour occurred between 5:00 and 6:00 PM.

4.2 Segment and Corridor Operations

In early December of 2018, the Sammamish City Council passed an emergency ordinance adopting a new segment and corridor volume to capacity standard. As of the writing of this memo, Council has not yet permanently codified the new segment and corridor capacity standards; however, it is anticipated that they will in the near future. The IPLR project is covered by segments 30 and 31 (SE 32nd Way-SE Klahanie Blvd). Segments 32 and 33 (SE Klahanie Blvd-SE 48th St) are south of the project study area and make up a future phase of the IPLR widening. The second phase is envisioned as a five-lane corridor-widening project from Klahanie Blvd to SE 48th St.

Table 1 shows the segment and corridor operations when compared to the new City standards (this table was taken from the City's recently passed emergency ordinance. The table shows volumes for year 2016 for segments 32 and 33, and volumes from the new 2018 counts for segments 30 and 31. All of the segments and corridors are currently meeting the City's newly adopted standards.

Table 1: Segment and Corridor Operations for year 2016/2018 (Without IPLR Phase 1 or 2)

2016/2018 HCM Modified Methodology																	
					Characteristics										AM	PM	
	Segment*		AM Volume	PM Volume	Speed limit (mph)	# Lanes	LT Lane	Median	RT Lane	ITS	FYA	HCM Category	2035 HCM Modified Capcity	AM V/C	PM V/C	Corridor ≤1.1 Segment ≤1.4	
	Issaquah-Pine Lake Road Corrido	**EB/SB**												**0.98**	**0.86**	**Pass**	**Pass**
		WB/NB												**0.58**	**1.09**	**Pass**	**Pass**
30	Issaquah-Pine Lk Rd - 228th Ave SE to SE 32nd Way[1]	EB	510	829	35	**2**	1					1	881	0.58	0.94	Pass	Pass
		WB	611	678								1		0.69	0.77	Pass	Pass
31	Issaquah-Pine Lk Rd - SE 32nd Way to SE Klahanie	NB	534	782	35	**2**	1					1	881	0.61	0.89	Pass	Pass
		SB	618	745								1		0.70	0.85	Pass	Pass
32	Issaquah-Pine Lk Rd - SE Klahanie to SE 46th St[2]	NB	391	990	35	**2**	1					1	881	0.44	1.12	Pass	Pass
		SB	979	742								1		1.11	0.84	Pass	Pass
33	Issaquah-Pine Lk Rd - SE 46th St to SE 48th St[2]	NB	444	1,207	35	**2**	1					1	881	0.50	1.37	Pass	Pass
		SB	1,078	717								1		1.22	0.81	Pass	Pass

Notes

Corridor V/C ratios are volume weighted.

[1] This segment transitions from a wider cross-section to two lanes, the narrower section was used.

[2] Volumes for these segments are consistent with the 2016 Concurrency update as 2018 volumes were not collected for these segments.

4.3 Traffic Operations

A summary of the existing lane configurations and traffic control devices at study area intersections is shown in **Figure 2**. The existing traffic operations analysis is presented below.

Delay and LOS

The Synchro and Sidra analysis produced results for critical movement, LOS and delay. As can be seen in Table 2, below, all intersections are currently operating within the City's operational standard of LOS D. However, field observations showed deficiencies at the SE 32nd Way roundabout were not captured by this model, which led to the more detailed simulation analysis below.

Table 2: Existing Intersection Operations

Intersection	Critical Movement	8-9 AM		5-6 PM	
		LOS	Delay	LOS	Delay
1: ILPR @ SE 32nd Way (Roundabout)	Overall	A	5.5	A	5.7
2: ILPR @ 234th Ave SE (2-way stop)	EB Left	C	15.4	C	16.8
3: ILPR @ SE 37th Pl (2-way stop)	WB Left	C	16.0	C	17.3
4: ILPR @ SE 40th Pl (2-way Stop)	WB Left	C	15.0	C	16.5
5: ILPR @ SE 42nd St (Signal)	Overall	A	6.1	A	6.4
6: ILPR @ Klahanie Blvd (Signal)	Overall	B	19.9	B	15.9

Source: DEA created and maintained Synchro and Sidra models (2018)

Travel Time and Queuing

It is common for the IPLR corridor to experience stop and go operations approaching the 32nd Way roundabout during various hours of the day. However, the deficiencies don't show up in the table above. This is due to operational deficiencies that are beyond the ability of the HCM compatible Synchro and Sidra programs to replicate. To capture these operational deficiencies, a VISSIM simulation model was used to analyze additional operational parameters to accurately reflect driver behaviors.

Travel times through the corridor were calculated to form a baseline from which to compare the future scenarios. In the morning, it currently takes as much as three minutes to travel south from the signal at 230th Lane SE, to the signal at Klahanie Boulevard. In the evening, it also currently takes as much as three minutes to travel north from the signal at Klahanie Boulevard to the signal at 230th Lane SE.

As such, the simulation model for the entire study area was reviewed and notable queuing was only observed at the 32nd Way roundabout. As the modeled queuing was consistent with the queuing observed in the field investigations, the existing model was deemed calibrated. The queuing observations are summarized in Table 3.

Table 3: Existing queue lengths approaching the IPLR/32nd Way intersection

	7:30 - 9:00 AM	4:45 – 6:00 PM
Westbound	25	8
Northbound	12	30
Southbound	15	12

NOTE: Queue lengths shown in number of vehicles.

5.0 NO-BUILD CONDITIONS

This section summarizes the operations of IPLR using 2035 volumes and the existing road geometry. In essence, summarizing what traffic conditions would be expected to look like if no improvements to the corridor were constructed.

5.1 Traffic Volumes

To calculate the future year 2035 demands, the City's adopted year 2035 travel demand model was used. The growth between the base year model volumes (2012) and the future year model volumes (2035) was calculated. The model growth was added to the existing 2018 counts, but because the counts to be grown were collected in 2018, only 17 years (2018 to 2035) of the 23 years (2012 to 2035) of model volume growth was used or approximately 74%. The resulting year 2035 projected volumes are shown in **Figure 3.**

5.2 Segment and Corridor Operations

Table 4 shows the segment and corridor operations when compared to the new City standards. The project level traffic demands are shown for segments 30 and 31 while the City's currently adopted 2035 VISUM model (paired with the 2012 base model) was used to estimate the 2035 traffic demands on segments 32 and 33.The northern segments (IPLR phase 1) are expected to meet the City's newly adopted standards while the southern segments (IPLR phase 2) are not expected to meet the City's newly adopted standards. In the morning and evening peak periods, the southbound and northbound corridors fail, respectively, as the overall corridor v/c ratios exceed the 1.1 standard.

Table 4: Segment and Corridor Operations for year 2035 (Without IPLR Phase 1 or 2)

2035 HCM Modified Methodology																AM	PM
	Segment*		AM Volume	PM Volume	Characteristics: Speed limit (mph)	# Lanes	LT Lane	Median	RT Lane	ITS	FYA	HCM Category	2035 HCM Modified Capcity	AM V/C	PM V/C	Corridor ≤1.1 Segment ≤1.4	
	Issaquah-Pine Lake Road Corrido	**EB/SB**												**1.12**	**1.01**	**Fail**	**Pass**
		WB/NB												**0.80**	**1.41**	**Pass**	**Fail**
30	Issaquah-Pine Lk Rd - 228th Ave SE to SE 32nd Way[1]	EB	705	1,055	35	**2**	1					1	881	0.80	1.20	Pass	Pass
		WB	750	940								1		0.85	1.07	Pass	Pass
31	Issaquah-Pine Lk Rd - SE 32nd Way to SE Klahanie	NB	740	1,035	35	**2**	1					1	881	0.84	1.17	Pass	Pass
		SB	760	820								1		0.86	0.93	Pass	Pass
32	Issaquah-Pine Lk Rd - SE Klahanie to SE 46th St	NB	690	1,370	35	**2**	1					1	881	0.78	1.56	Pass	Fail
		SB	1,110	790								1		1.26	0.90	Pass	Pass
33	Issaquah-Pine Lk Rd - SE 46th St to SE 48th St	NB	620	1,465	35	**2**	1					1	881	0.70	1.66	Pass	Fail
		SB	1,195	825								1		1.36	0.94	Pass	Pass

Notes
Corridor V/C ratios are volume weighted.

[1] This segment transitions from a wider cross-section to two lanes, the narrower section was used.

5.3 Traffic Operations

Delay and LOS

To be consistent with the City's operational standards, an HCM compliant analysis was conducted. The analysis produced operational results for critical movement, LOS, and delay. As can be seen in Table 5, delay increased for all intersections compared to the existing conditions. In the AM, the LOS at Klahanie Blvd went from LOS B to LOS E, which is beyond the City operational standards. In the PM, all intersections operate within the City operational standards.

Table 5: 2035 No-Build Intersection Operations

Intersection	Critical Movement	8-9 AM LOS	8-9 AM Delay	5-6 PM LOS	5-6 PM Delay
1: ILPR @ SE 32nd Way (Roundabout)	Overall	B	10.9	B	14.3
2: ILPR @ 234th Ave SE (2-way stop)	EB Left	C	21.1	D	26.7
3: ILPR @ SE 37th Pl (2-way stop)	WB Left	C	20.0	C	24.4
4: ILPR @ SE 40th Pl (2-way stop)	WB Left	C	20.1	C	23.0
5: ILPR @ SE 42nd St (Signal)	Overall	A	7.6	A	8.3
6: ILPR @ Klahanie Blvd (Signal)	Overall	E	55.1	C	33.9

Source: DEA created and maintained Synchro and Sidra models (2018)

Travel Time and Queuing

In general, the travel times through the study area increased from the existing 2018 conditions to the future 2035 conditions. In the morning, the southbound travel times are projected to increase by approximately 25%. In the evening, the northbound travel times are projected to increase by approximately 60%.

The increased travel times are due to the declining operations of the intersections of Klahanie Boulevard and 32nd Way. After reviewing the simulation, the 32nd Way roundabout was again the only area with notable queuing, as shown in Table 6.

Table 6: Background queue lengths approaching the IPLR/32nd Way intersection

	7:30 - 9:00 AM	4:45 – 6:00 PM
Westbound	30	10
Northbound	28	40
Southbound	45	42

NOTE: Queue lengths shown in number of vehicles.

6.0 BUILD CONDITIONS

The build scenarios seek to upgrade the corridor to current design standards and provide bicycle and pedestrian amenities and better transit access through the corridor while also providing mitigation for deficiencies that were observed in the no-build scenario.

The no-build results for Klahanie Blvd showed that the intersection would operate at LOS E, which is beyond the City's operational standards, and the simulation identified excessive queuing approaching the SE 32nd Way roundabout.

To mitigate the deficiency at the Klahanie Blvd signalized intersection, two improvements were identified. The first improvement updates signal timing and operational inefficiencies to slightly improve operations within the City's standards. The second improvement converts the signalized intersection to a roundabout with two southbound through lanes and dedicated northbound and westbound right-turn slip lanes to more fully address the projected failure.

Two improvements were also identified to mitigate the deficiency at the SE 32nd Way roundabout. The first improvement is to increase the capacity of the roundabout with a northbound right turn slip lane and a dedicated southbound left turn lane while also updating the overall design to improve vehicular flow through the roundabout. The second improvement would convert the roundabout to a signalized intersection.

While the intersection of SE 37th Place meets the City's operational standards, there are a lack of protected pedestrian crossings of IPLR, limiting access to transit. Signal warrant analyses were conducted at the unsignalized intersections of SE 40th Place, SE 37th Place, and 234th Avenue SE. SE 37th Place was the only intersection to meet signal warrants and is located roughly midway between the formalized pedestrian crossings at SE 42nd Street and SE 32nd Way. As such, a signal is proposed for the SE 37th Place intersection. Signal warrant summary sheets can be found in **Appendix B**.

Figure 4 shows the proposed intersection lane configurations as well as traffic control devices.

6.1 Segment and Corridor Operations

In early December of 2018, the Sammamish City Council adopted an emergency ordinance which established new segment and corridor volume to capacity standards. The IPLR project is covered by segments 30 and 31. Segments 32 and 33 are south of the project study area and make up a future phase of the IPLR widening. The second phase is envisioned as a five-lane corridor-widening project from Klahanie Blvd to Issaquah Fall City Road.

If the future phase of the IPLR project is not completed, the corridor will not meet the City's standards, as can be seen in Table 7.

Table 7: Segment and Corridor Operations for year 2035 (Without IPLR Phase 2)

2035 HCM Modified Methodology																		
	Segment*		AM Volume	PM Volume	Characteristics							HCM Category	2035 HCM Modified Capcity	AM V/C	PM V/C	AM	PM
					Speed limit (mph)	# Lanes	LT Lane	Median	RT Lane	ITS	FYA					Corridor ≤1.1 Segment ≤1.4	
	Issaquah-Pine Lake Road Corrido	**EB/SB**												**1.09**	**0.94**	**Pass**	**Pass**
		WB/NB												**0.75**	**1.36**	**Pass**	**Fail**
30	Issaquah-Pine Lk Rd - 228th Ave SE to SE 32nd Way[1]	EB	705	1,055	35	**2**	1	1		1	1	1	987	0.71	1.07	Pass	Pass
		WB	750	940								1		0.76	0.95	Pass	Pass
31	Issaquah-Pine Lk Rd - SE 32nd Way to SE Klahanie	NB	740	1,035	35	**2**	1	1		1	1	1	987	0.75	1.05	Pass	Pass
		SB	760	820								1		0.77	0.83	Pass	Pass
32	Issaquah-Pine Lk Rd - SE Klahanie to SE 46th St	NB	690	1,370	35	**2**	1					1	881	0.78	1.56	Pass	Fail
		SB	1,110	790								1		1.26	0.90	Pass	Pass
33	Issaquah-Pine Lk Rd - SE 46th St to SE 48th St	NB	620	1,465	35	**2**	1					1	881	0.70	1.66	Pass	Fail
		SB	1,195	825								1		1.36	0.94	Pass	Pass

Notes
Corridor V/C ratios are volume weighted.

[1] This segment transitions from a wider cross-section to two lanes, the narrower section was used.

If the widening of the second phase of IPLR is constructed (assumed to occur before 2035), all segments and the overall corridor meet the newly adopted City standards as seen in Table 8.

Table 8: Segment and Corridor Operations for year 2035 (With IPLR Phase 2)

2035 HCM Modified Methodology																		
	Segment*		AM Volume	PM Volume	Characteristics							HCM Category	2035 HCM Modified Capcity	AM V/C	PM V/C	AM	PM
					Speed limit (mph)	# Lanes	LT Lane	Median	RT Lane	ITS	FYA					Corridor ≤1.1 Segment ≤1.4	
	Issaquah-Pine Lake Road Corrido	**EB/SB**												**0.66**	**0.72**	**Pass**	**Pass**
		WB/NB												**0.56**	**0.85**	**Pass**	**Pass**
30	Issaquah-Pine Lk Rd - 228th Ave SE to SE 32nd Way[1]	EB	705	1,055	35	**2**	1	1		1	1	1	987	0.71	1.07	Pass	Pass
		WB	750	940								1		0.76	0.95	Pass	Pass
31	Issaquah-Pine Lk Rd - SE 32nd Way to SE Klahanie	NB	740	1,035	35	**2**	1	1		1	1	1	987	0.75	1.05	Pass	Pass
		SB	760	820								1		0.77	0.83	Pass	Pass
32	Issaquah-Pine Lk Rd - SE Klahanie to SE 46th St	NB	690	1,370	35	**4**	1	1		1	1	2	1,896	0.36	0.72	Pass	Pass
		SB	1,110	790								2		0.59	0.42	Pass	Pass
33	Issaquah-Pine Lk Rd - SE 46th St to SE 48th St	NB	620	1,465	35	**4**	1	1		1	1	2	1,896	0.33	0.77	Pass	Pass
		SB	1,195	825								2		0.63	0.44	Pass	Pass

Notes
Corridor V/C ratios are volume weighted.

[1] This segment transitions from a wider cross-section to two lanes, the narrower section was used.

6.2 Traffic Volumes

The traffic volumes in the build conditions are held consistent with those of the no-build conditions.

6.3 Traffic Operations

The build operations results were compared to the no-build results to confirm that the proposed mitigations address the deficiencies observed in the no-build models.

Delay and LOS

The Synchro and Sidra analysis produced operational results for critical movement, LOS and delay. The table below shows the results of the build scenario.

Replacing the roundabout at SE 32nd Way with a traffic signal would increase delay by about ten seconds on average and the intersection LOS would increase from A to B. While there would be increased delay according the HCM intersection equations, the queuing is expected to be much improved with either the new roundabout design or the new signalized design.

The intersection at Klahanie Blvd is expected to operate at LOS A as a roundabout, and LOS D and C in the AM and PM peak hours, respectively. With the proposed mitigations, all intersections would meet the City's operational standards.

The full operations are shown in Table 9.

Table 9: 2035 Build Intersection Operations

Intersection	Critical Movement	8-9 AM		5-6 PM	
		LOS	Delay	LOS	Delay
1: ILPR @ SE 32nd Way (Roundabout)	Overall	A	8.6	A	6.3
1: ILPR @ SE 32nd Way (Signal)	Overall	B	16.6	B	15.6
2: ILPR @ 234th Ave SE (2-way stop)	EB Left	C	21.5	D	28.5
3: ILPR @ SE 37th Pl (Signal)	Overall	A	9.9	B	12.1
4: ILPR @ SE 40th Pl (2-way stop)	WB Left	C	20.1	C	23.0
5: ILPR @ SE 42nd St (Signal)	Overall	A	7.6	A	8.3
6: ILPR @ Klahanie Blvd (Signal)	Overall	D	54.7	C	33.9
6: ILPR @ Klahanie Blvd (Roundabout)	Overall	A	9.2	A	7.7

Source: DEA created and maintained Synchro and Sidra models (2018)

Travel Time and Queuing

In general, the travel times through the study area were much improved when compared to the no-build 2035 conditions. Simulation models were created for a build option with signalized intersections at Klahanie and 32nd, and with roundabout intersections at Klahanie and 32nd. In the morning, the signalized and roundabout options operate similarly with southbound travel times decreasing by between 10 and 40%. In the evening, the northbound travel times decrease by between 5% and 45%.

Either of the build options would be expected to drastically improve travel times in the near future and allow travel times in the year 2035 to be similar to existing levels.

Queuing deficiencies approaching the 32nd Way roundabout are shown in Table 10. For comparative purposes, the background (2035 volumes and existing geometry) queue lengths are also shown.

Table 10: Background queue lengths approaching the IPLR/32nd Way intersection

	7:30 - 9:00 AM			4:45 – 6:00 PM		
	2035 Background	2035 Build Roundabout	2035 Build Signal	2035 Background	2035 Build Roundabout	2035 Build Signal
Westbound	30	28	7	10	10	6
Northbound	28	8	20	40	34	40
Southbound	45	11	2	42	10	5

NOTE: Queue lengths shown in number of vehicles.

For the southbound and westbound directions, the signal results in the most improved queuing, while in the northbound direction, the roundabout results in the most improved queuing.

7.0 ROUNDABOUTS – BENEFITS AND DRAWBACKS

7.1 Environmental Impact

In some cases, roundabouts can allow for a reduction in greenhouse gas emissions by reducing or all together eliminating vehicle stops and starts. As stopping and starting reduces, the time spent idling is decreased which translates into less fuel consumption and fewer emissions.

7.2 Vehicular Safety

Many studies have shown that roundabouts, when designed properly, are safer intersection treatments than standard signalized intersections. Roundabouts result in fewer conflict points and the ones that do exist typically result in less severe crashes, typically sideswipe and rear-end instead of angle or head on crashes. A Minnesota DOT study concluded that single lane roundabouts have been shown to reduce fatal and serious injury crashes by over 80 percent and reduce overall crashes by over 30 percent.

7.3 Yield Confusion

Roundabouts with multiple circulating lanes don't have the same safety record as the single lane roundabouts. Injury crashes have been shown to decrease for single lane roundabouts, while non-injury (property damage only) crashes often increase due to the confusion of yielding upon entry or exit of the roundabout for multiple lanes.

7.4 Pedestrian Safety

Pedestrian crossings are not protected at roundabouts. The pedestrians are relying on the drivers to yield to them as they attempt to cross the approaches of the roundabout. Individuals with vision impairments have difficulty determining when traffic is yielding to them. As bicyclists are suggested to move onto the sidewalk and traverse the roundabouts using the striped crosswalks, the safety implications for pedestrians also apply to bicyclists.

7.5 Emergency Vehicle Priority

With a roundabout, there is no way to give priority to an approaching emergency vehicle. The emergency vehicles priority relies on other drivers noticing the emergency vehicle, getting out of the way, and staying out of the way.

7.6 Unbalanced Traffic Flows

Unbalanced flows on the approaches to a roundabout can lead to drivers ignoring the yielding rules. If the majority of the flow is in the north/south directions and they usually don't have to yield for circulating vehicles, then drivers get in the pattern and quickly learn to not stop, even in the case of a circulating vehicle.

7.7 Non Peak Hour Vehicle Delays

During times of lower traffic volumes (mid-day, nights, weekends) the roundabout would be expected to have less delay than a comparable signalized intersection as vehicles from all four approaches are capable of entering the roundabout at the same time and traversing the intersection. In a signal, each approach must wait its turn for the green light.

7.8 Right-of-way Needs

When properly designed, roundabouts require more right-of-way than a signal. The curves on the approaches, and the correct sizing of the center island and approach islands require more land than a typical signalized intersection.

7.9 Traffic Calming

By physically slowing vehicles as they approach the roundabout, they can provide a good transition between higher and lower speed areas. The school speed zone at the north end of the IPLR corridor is a great example of the transition between a higher speed corridor and a lower speed section of the corridor.

7.10 Inclement Weather

Vertical grades when approaching roundabouts can be problematic in areas that are prone to snow and ice. If an approach to a roundabout is going downhill, the curves of the roundabout approach can compound the driver's inability to stop.

7.11 Landscaping

Roundabouts in Sammamish are typically landscaped and require ongoing maintenance.

8.0 CONCLUSIONS AND RECOMMENDATIONS

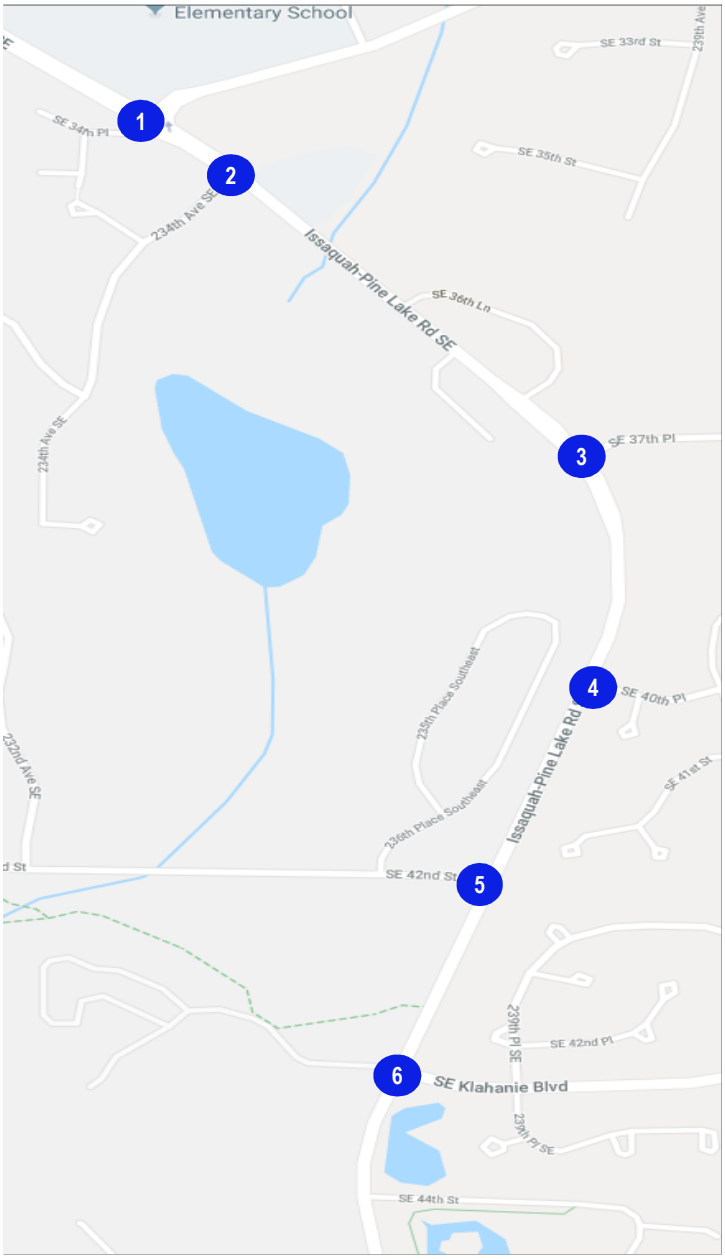
The traffic analysis has shown that the IPLR corridor between Klahanie Boulevard and SE 32nd Way should be widened to a three-lane cross section to accommodate turning maneuvers and multi-modal transportation needs. In addition, it is assumed that all signalized intersections will be upgraded to include Intelligent Transportation System operations, and Flashing Yellow Arrows, where appropriate.

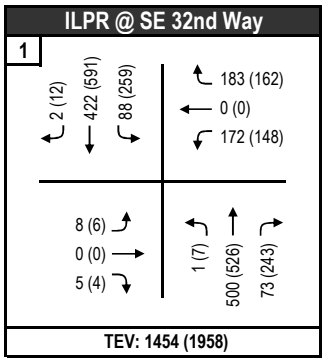
The intersection of IPLR at SE 32nd Way can be improved with either an updated roundabout or signalized intersection design. However, it is recommended that the intersection be converted to a signal due to the lack of available right-of-way and proximity to the elementary school. Lack of available right-of-way prevents optimization of the roundabout, and the circulation patterns of Sunny Hills Elementary and pedestrian crossings operate more efficiently with a signalized intersection.

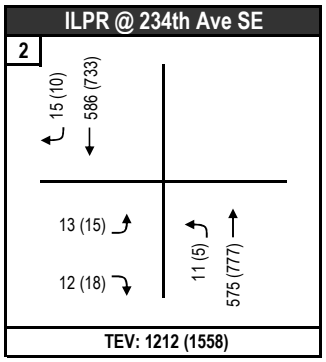
The intersection of IPLR at SE 37th Place is an ideal location for the installation of a traffic signal to facilitate safe vehicular turning movements onto and off IPLR. The signal will also provide for a protected pedestrian crossing of IPLR.

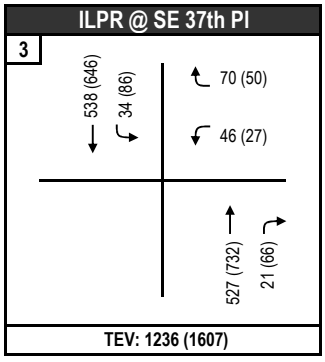
The temporary signal at the intersection of IPLR at SE 42nd Street should be replaced with a permanent signal and the eastbound approach should be widened to provide for a dedicated left-turn lane and a dedicated right-turn lane.

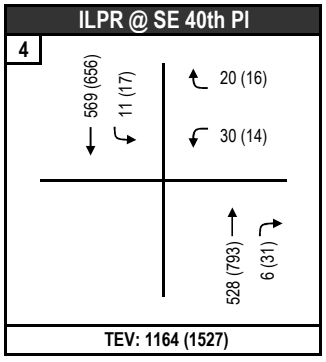
The intersection of IPLR at Klahanie Boulevard could be improved by the installation of either an updated signal or a roundabout. While both designs meet the applicable City standards, the roundabout design is expected to function more efficiently than the signal. However, both options should remain as further discussions progress with the Issaquah School District regarding access to a proposed school to the west of IPLR and south of Klahanie Boulevard.

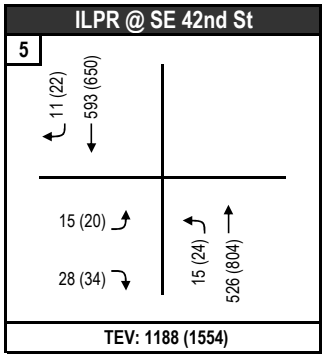


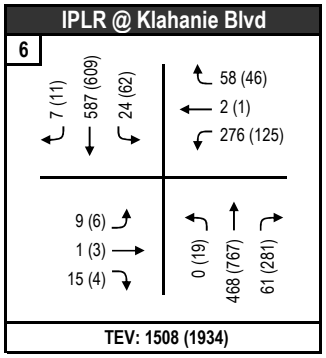












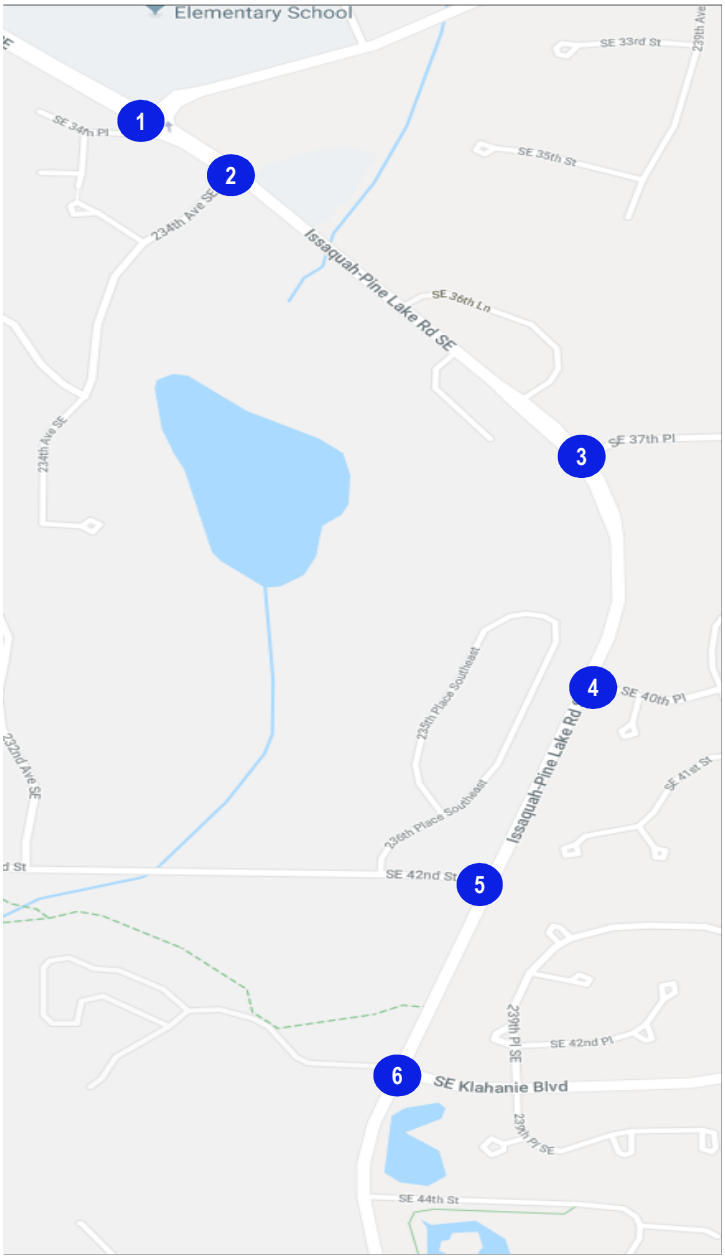
Legend

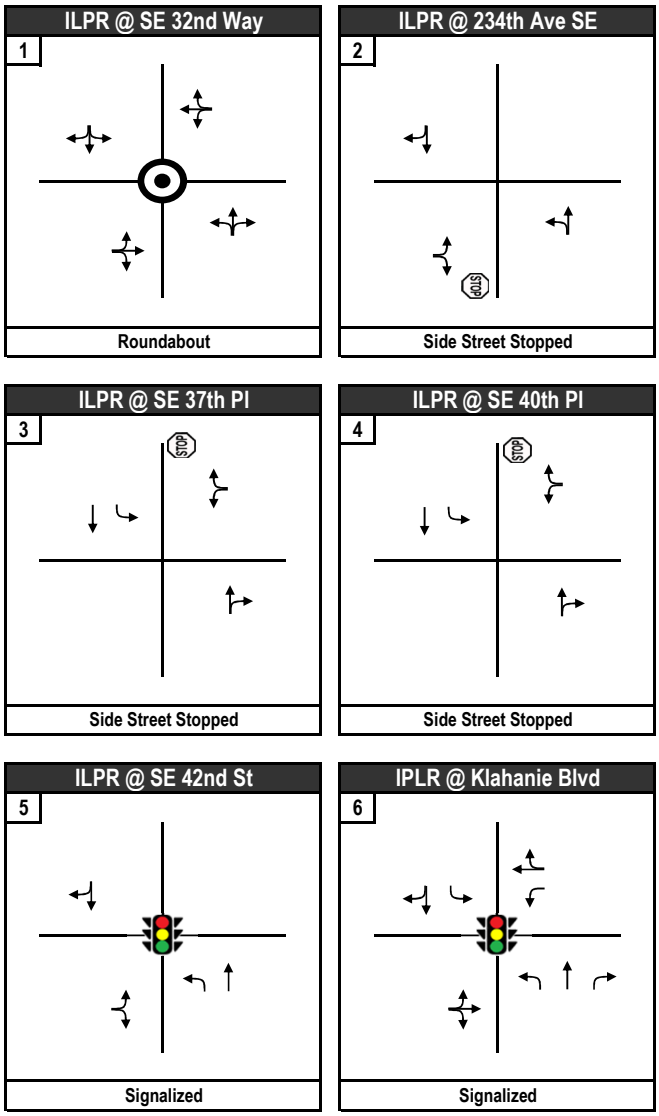
### (###)	Peak Hour Volume: AM (PM)
TEV: ### (###)	Total Entering Volume: AM (PM)
→	Allowable Movement
#	Study Area Intersection

Figure 1

Existing Turning Movement Volumes

IPLR Improvements





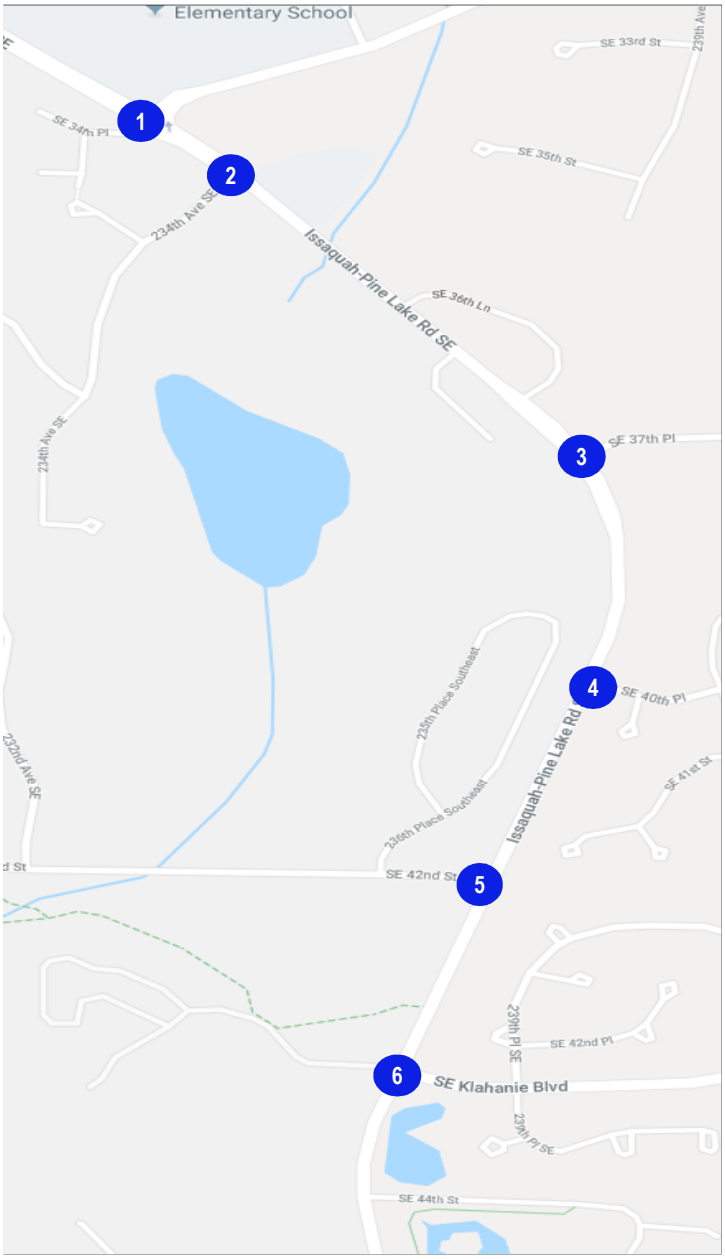
Legend

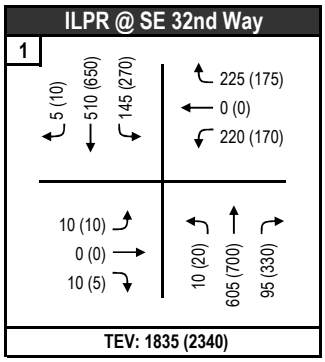
- Allowable Movement
- # Study Area Intersection
- Signalized Intersection
- Roundabout Intersection
- STOP Stop Controlled Intersection

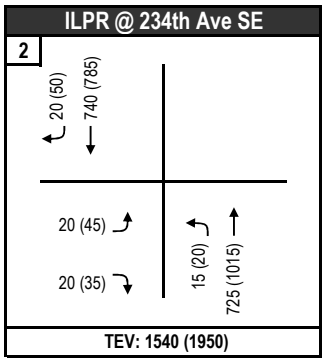
Figure 2

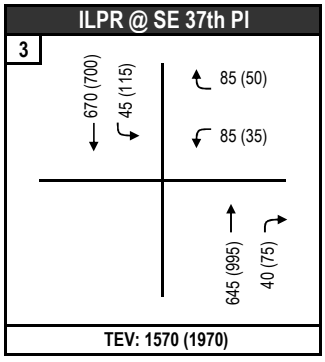
Existing Lane Configurations

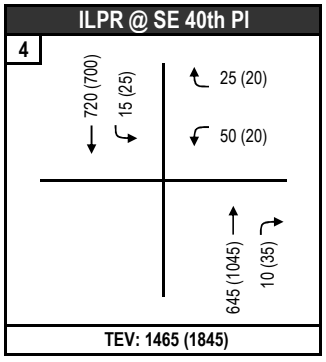
IPLR Improvements

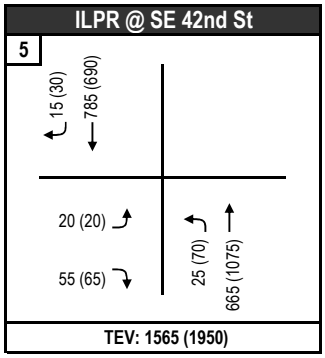


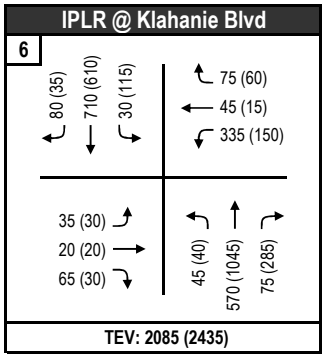












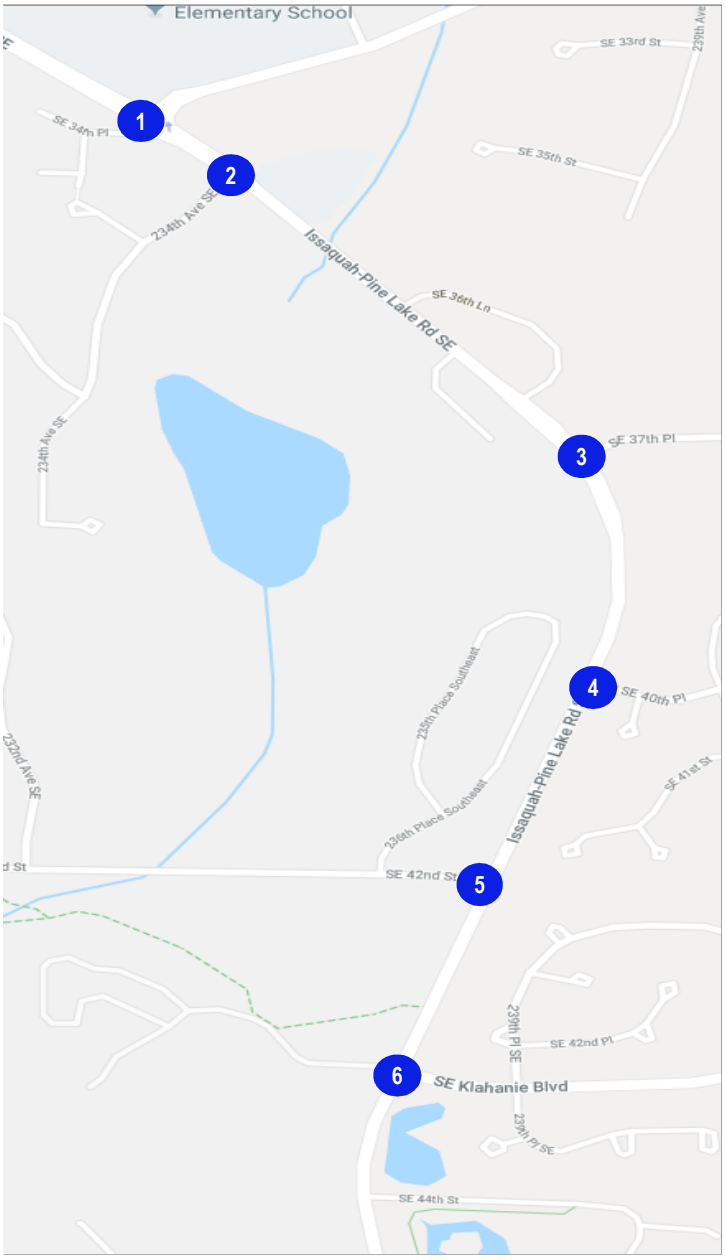
Legend

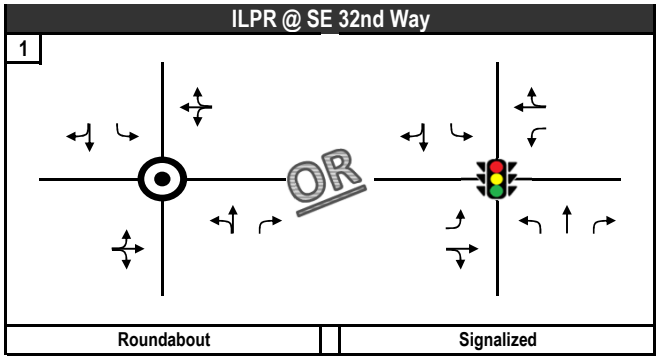
### (###)	Peak Hour Volume: AM (PM)
TEV: ### (###)	Total Entering Volume: AM (PM)
→	Allowable Movement
#	Study Area Intersection

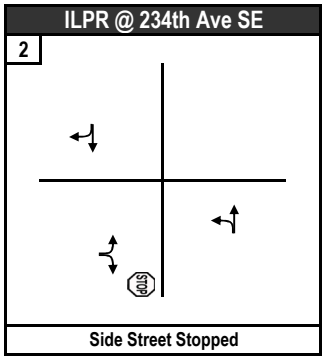
Figure 3

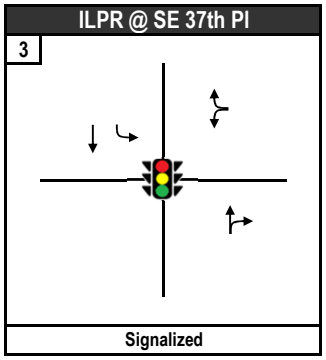
Future 2035 Turning Movement Volumes

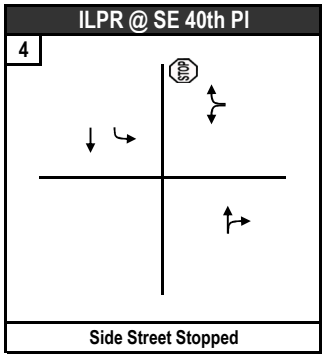
IPLR Improvements

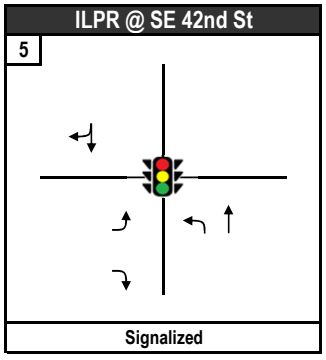


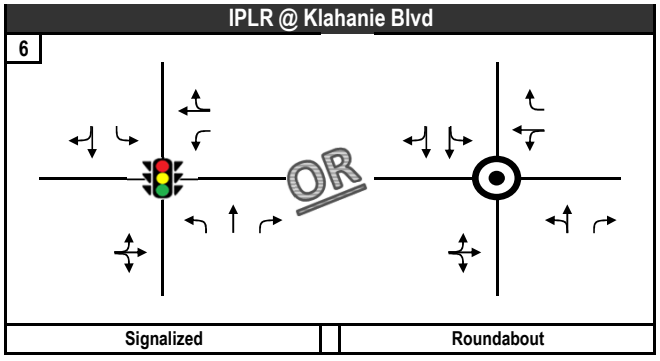












Legend

- Allowable Movement
- # Study Area Intersection
- Signalized Intersection
- Roundabout Intersection
- STOP Stop Controlled Intersection

Figure 4

Proposed Lane Configurations

IPLR Improvements

Jed Ireland
City of Sammamish Dept. of Public Works
March, 2019

APPENDICES

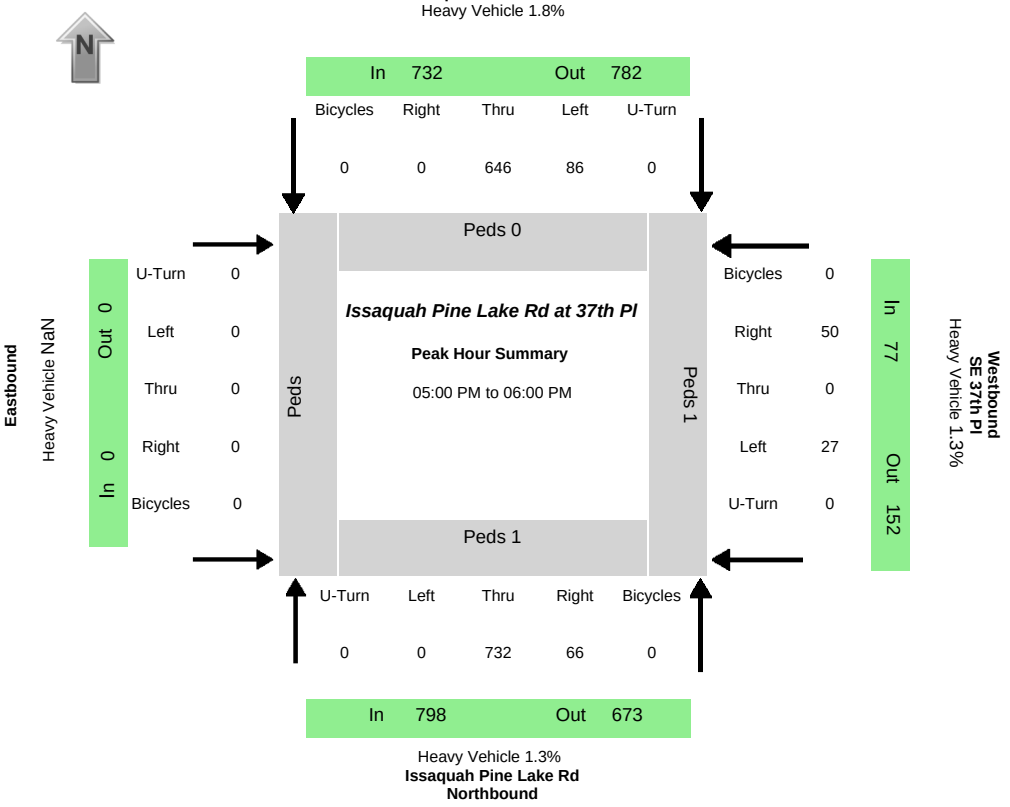
Jed Ireland
City of Sammamish Dept. of Public Works
March, 2019

APPENDIX A:

Traffic Counts

K-D-N
KEY DATA NETWORK

Data Provided by K-D-N.com 503-594-4224	
N/S street	*Issaquah Pine Lake Rd*
E/W street	*SE 37th Pl*
City, State	Samammish WA
Site Notes	
Location	47.574969 - -122.022289
Start Date	Thursday, May 17, 2018
Start Time	04:00:00 PM
Weather	
Study ID #	
Peak Hour Start	05:00:00 PM
Peak 15 Min Start	05:10:00 PM
PHF (15-Min Int)	0.92



Peak-Hour Volumes (PHV)

Northbound				Southbound				Eastbound				Westbound				Entering				Leaving			
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	NB	SB	EB	WB	NB	SB	EB	WB
0	732	66	0	86	646	0	0	0	0	0	0	27	0	50	0	798	732	0	77	673	782	0	152

Percent Heavy Vehicles

0.0%	1.4%	0.0%	0.0%	0.0%	2.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.0%	0.0%	1.3%	1.8%	NaN	1.3%	1.9%	1.4%	NaN	0.0%

PHV- Bicycles

Northbound				Southbound				Eastbound				Westbound				
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum
	0	0	0	0	0		0					0		0	0	0

PHV - Pedestrians

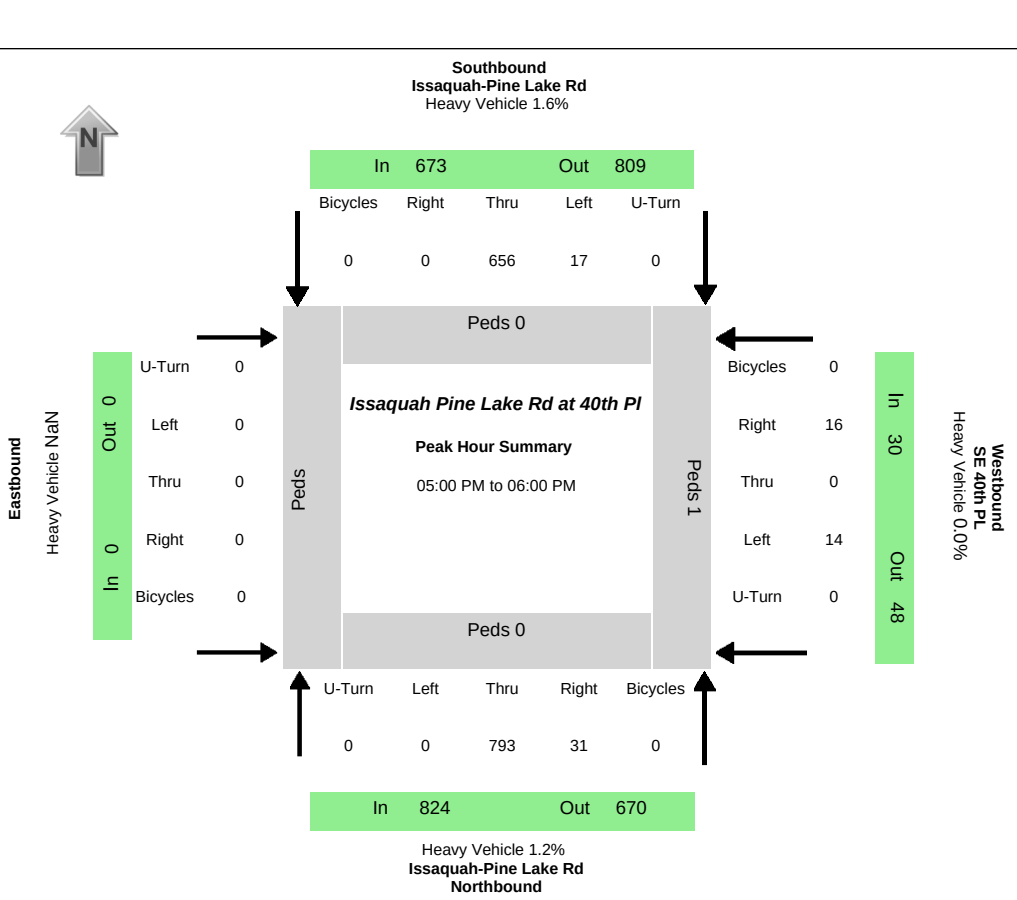
in Crosswalk				
NB	SB	EB	WB	Sum
1	0		1	2

All Vehicle Volumes

	Northbound Issaquah Pine Lake Rd				Southbound Issaquah Pine Lake Rd				Eastbound				Westbound SE 37th Pl				15 Min	1 HR
Time	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum	Sum
04:00:00 PM		48	5	0	5	52		0					3		1	0		
04:05:00 PM		45	4	0	3	57		0					2		4	0		
04:10:00 PM		44	3	0	2	44		0					1		3	0	326	
04:15:00 PM		54	3	0	6	54		0					3		3	0	335	
04:20:00 PM		34	2	0	3	61		0					2		4	0	326	
04:25:00 PM		53	3	0	3	52		0					3		2	0	345	
04:30:00 PM		46	2	0	5	48		0					2		4	0	329	
04:35:00 PM		48	3	0	7	56		0					5		4	0	346	
04:40:00 PM		53	7	0	3	54		0					2		3	0	352	
04:45:00 PM		63	6	0	11	65		0					0		5	0	395	
04:50:00 PM		53	5	0	3	43		0					4		3	0	383	
04:55:00 PM		58	2	0	4	51		0					2		4	0	382	1405
05:00:00 PM		59	8	0	6	55		0					1		0	0	361	1420
05:05:00 PM		67	6	0	6	61		0					2		4	0	396	1451
05:10:00 PM		60	8	0	9	59		0					4		4	0	419	1498
05:15:00 PM		60	8	0	5	50		0					5		9	0	427	1512
05:20:00 PM		64	5	0	18	60		0					1		6	0	435	1560
05:25:00 PM		56	3	0	7	56		0					3		2	0	418	1571
05:30:00 PM		61	2	0	6	44		0					2		2	0	398	1581
05:35:00 PM		61	2	0	8	53		0					3		2	0	373	1587
05:40:00 PM		63	2	0	6	52		0					3		7	0	379	1598
05:45:00 PM		68	10	0	6	61		0					1		5	0	413	1599
05:50:00 PM		51	4	0	5	41		0					1		6	0	392	1596
05:55:00 PM		62	8	0	4	54		0					1		3	0	391	1607

K-D-N
KEY DATA NETWORK

Data Provided by K-D-N.com 503-594-4224	
N/S street	*Issaquah-Pine Lake Rd*
E/W street	*SE 40th PL*
City, State	Samammish WA
Site Notes	
Location	47.572275 - -122.022233
Start Date	Thursday, May 17, 2018
Start Time	04:00:00 PM
Weather	
Study ID #	
Peak Hour Start	05:00:00 PM
Peak 15 Min Start	05:00:00 PM
PHF (15-Min Int)	0.94



Peak-Hour Volumes (PHV)

Northbound				Southbound				Eastbound				Westbound				Entering				Leaving			
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	NB	SB	EB	WB	NB	SB	EB	WB
0	793	31	0	17	656	0	0	0	0	0	0	14	0	16	0	824	673	0	30	670	809	0	48

Percent Heavy Vehicles

0.0%	1.3%	0.0%	0.0%	0.0%	1.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.2%	1.6%	NaN	0.0%	1.6%	1.2%	NaN	0.0%

PHV- Bicycles

Northbound				Southbound				Eastbound				Westbound				
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum
	0	0	0	0	0		0					0		0	0	0

PHV - Pedestrians

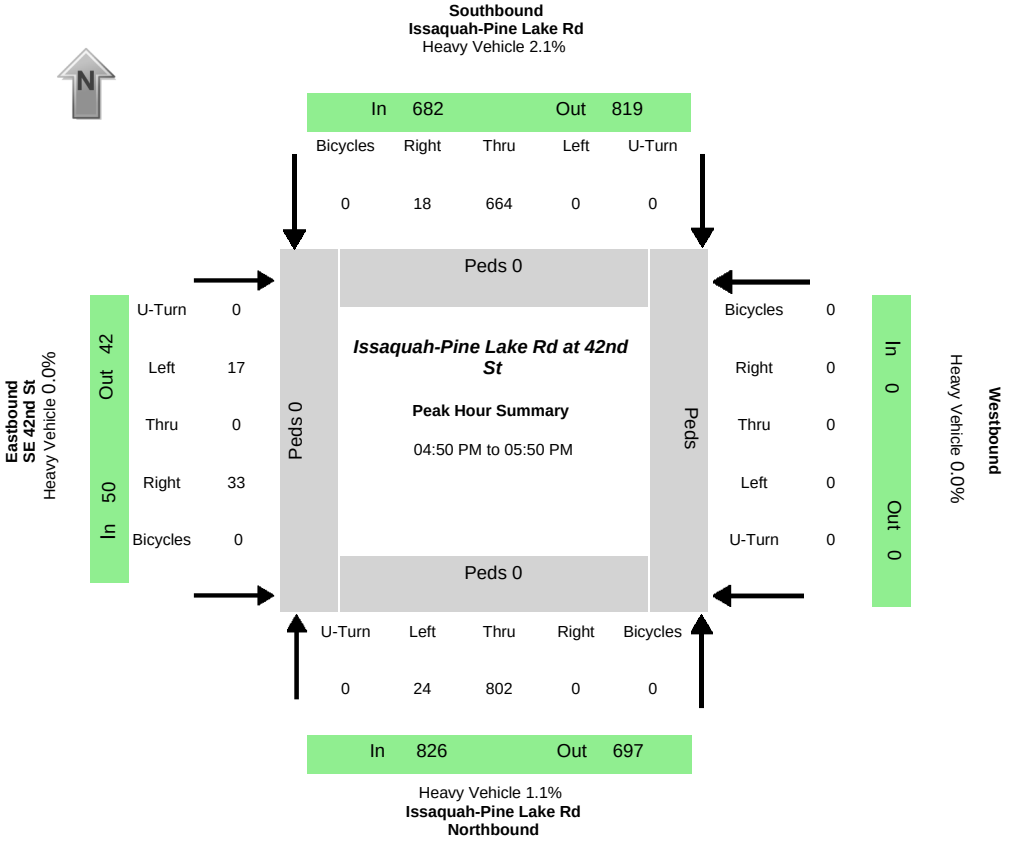
in Crosswalk				
NB	SB	EB	WB	Sum
0	0		1	1

All Vehicle Volumes

	Northbound Issaquah-Pine Lake Rd				Southbound Issaquah-Pine Lake Rd				Eastbound				Westbound SE 40th PL				15 Min	1 HR
Time	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum	Sum
04:00:00 PM		55	2	0	1	50		0					0		3	0		
04:05:00 PM		44	4	0	2	55		0					3		1	0		
04:10:00 PM		50	0	0	1	46		0					2		0	0	319	
04:15:00 PM		52	4	0	3	53		0					1		2	0	323	
04:20:00 PM		34	5	0	2	58		0					1		1	0	315	
04:25:00 PM		56	0	0	1	58		0					1		0	0	332	
04:30:00 PM		44	3	0	1	49		0					2		1	0	317	
04:35:00 PM		52	3	0	2	59		0					1		1	0	334	
04:40:00 PM		61	2	0	2	52		0					0		1	0	336	
04:45:00 PM		63	4	0	3	65		0					0		1	0	372	
04:50:00 PM		56	2	0	2	47		0					1		0	0	362	
04:55:00 PM		57	2	0	1	52		0					3		2	0	361	1348
05:00:00 PM		71	0	0	1	53		0					3		4	0	357	1369
05:05:00 PM		68	5	0	1	63		0					1		2	0	389	1400
05:10:00 PM		65	2	0	0	64		0					0		1	0	404	1433
05:15:00 PM		71	0	0	1	54		0					0		0	0	398	1444
05:20:00 PM		66	3	0	3	58		0					1		1	0	390	1475
05:25:00 PM		61	2	0	4	56		0					1		0	0	382	1483
05:30:00 PM		58	3	0	0	45		0					1		3	0	366	1493
05:35:00 PM		65	2	0	1	57		0					2		0	0	361	1502
05:40:00 PM		64	4	0	3	51		0					2		2	0	363	1510
05:45:00 PM		76	5	0	1	59		0					2		0	0	396	1517
05:50:00 PM		55	3	0	2	40		0					0		2	0	371	1511
05:55:00 PM		73	2	0	0	56		0					1		1	0	378	1527

K-D-N
KEY DATA NETWORK

Data Provided by K-D-N.com 503-594-4224	
N/S street	*Issaquah-Pine Lake Rd*
E/W street	*SE 42nd St*
City, State	Samammish WA
Site Notes	
Location	47.569854 - -122.023593
Start Date	Thursday, May 17, 2018
Start Time	04:00:00 PM
Weather	
Study ID #	
Peak Hour Start	04:50:00 PM
Peak 15 Min Start	05:05:00 PM
PHF (15-Min Int)	0.95



Peak-Hour Volumes (PHV)

Northbound				Southbound				Eastbound				Westbound				Entering				Leaving			
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	NB	SB	EB	WB	NB	SB	EB	WB
24	802	0	0	0	664	18	0	17	0	33	0	0	0	0	0	826	682	50	0	697	819	42	0

Percent Heavy Vehicles

0.0%	1.1%	0.0%	0.0%	0.0%	2.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.1%	2.1%	0.0%	0.0%	2.0%	1.1%	0.0%	0.0%

PHV- Bicycles

Northbound				Southbound				Eastbound				Westbound				
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum
0	0		0		0	0	0	0		0	0					0

PHV - Pedestrians

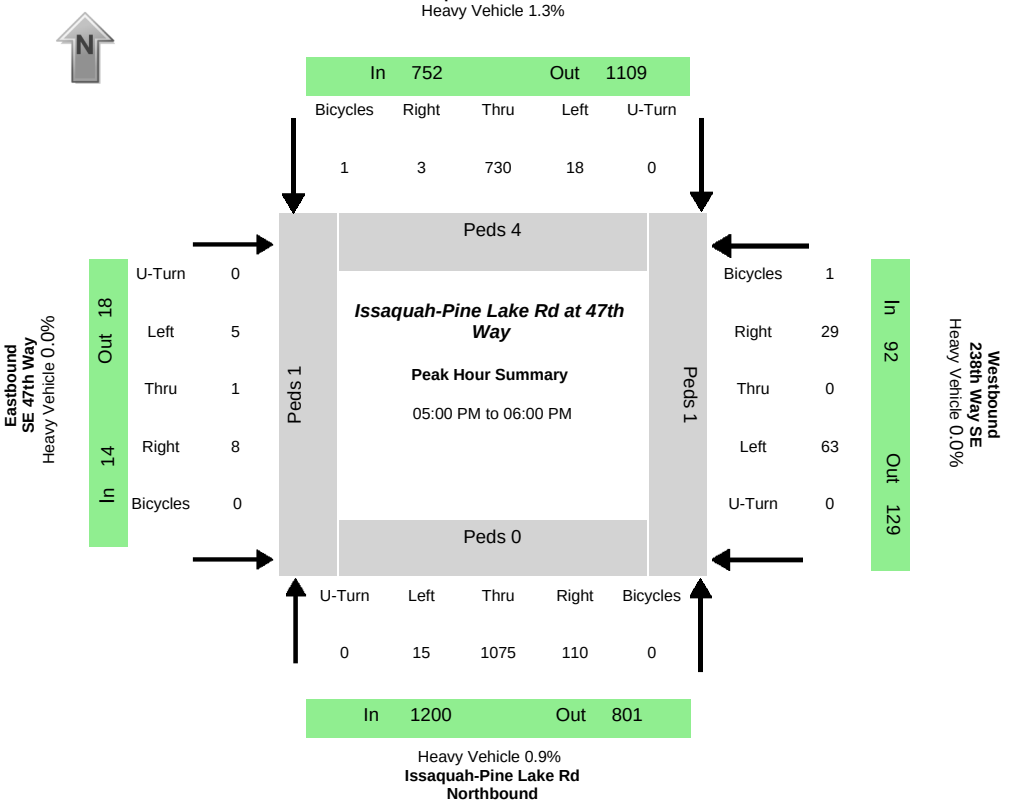
in Crosswalk					
NB	SB	EB	WB	Sum
0	0	0		0

All Vehicle Volumes

	Northbound Issaquah-Pine Lake Rd				Southbound Issaquah-Pine Lake Rd				Eastbound SE 42nd St				Westbound				15 Min	1 HR
Time	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum	Sum
04:00:00 PM	0	55		0		52	1	0	2		0	0						
04:05:00 PM	4	41		0		55	4	0	0		1	0						
04:10:00 PM	3	50		0		49	1	0	3		1	0					322	
04:15:00 PM	1	52		0		52	1	0	2		0	0					320	
04:20:00 PM	2	42		0		57	2	0	0		1	0					319	
04:25:00 PM	3	54		0		58	2	0	1		3	0					333	
04:30:00 PM	0	47		0		50	0	0	1		1	0					324	
04:35:00 PM	3	57		0		54	1	0	0		3	0					338	
04:40:00 PM	2	62		0		54	1	0	1		6	0					343	
04:45:00 PM	1	68		0		62	0	0	1		4	0					380	
04:50:00 PM	1	69		0		55	0	0	0		2	0					389	
04:55:00 PM	1	57		0		52	1	0	0		5	0					379	1377
05:00:00 PM	0	72		0		54	1	0	0		3	0					373	1397
05:05:00 PM	4	74		0		65	2	0	0		3	0					394	1440
05:10:00 PM	0	62		0		59	4	0	1		2	0					406	1461
05:15:00 PM	1	72		0		54	0	0	5		3	0					411	1488
05:20:00 PM	2	66		0		54	3	0	1		1	0					390	1511
05:25:00 PM	3	69		0		53	3	0	0		5	0					395	1523
05:30:00 PM	2	59		0		45	1	0	3		3	0					373	1537
05:35:00 PM	4	59		0		60	2	0	4		1	0					376	1549
05:40:00 PM	2	72		0		50	1	0	1		1	0					370	1550
05:45:00 PM	4	71		0		63	0	0	2		4	0					401	1558
05:50:00 PM	0	58		0		39	1	0	1		3	0					373	1533
05:55:00 PM	2	70		0		54	4	0	2		5	0					383	1554

K-D-N
KEY DATA NETWORK

Data Provided by K-D-N.com 503-594-4224	
N/S street	*Issaquah-Pine Lake Rd*
E/W street	*SE 47th Way*
City, State	Samammish WA
Site Notes	
Location	47.561358 - -122.02511
Start Date	Thursday, May 17, 2018
Start Time	04:00:00 PM
Weather	
Study ID #	
Peak Hour Start	05:00:00 PM
Peak 15 Min Start	05:35:00 PM
PHF (15-Min Int)	0.94



Peak-Hour Volumes (PHV)																								
Northbound				Southbound				Eastbound				Westbound				Entering				Leaving				
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	NB	SB	EB	WB	NB	SB	EB	WB	
15	1075	110	0	18	730	3	0	5	1	8	0	63	0	29	0	1200	751	14	92	801	1109	18	129	

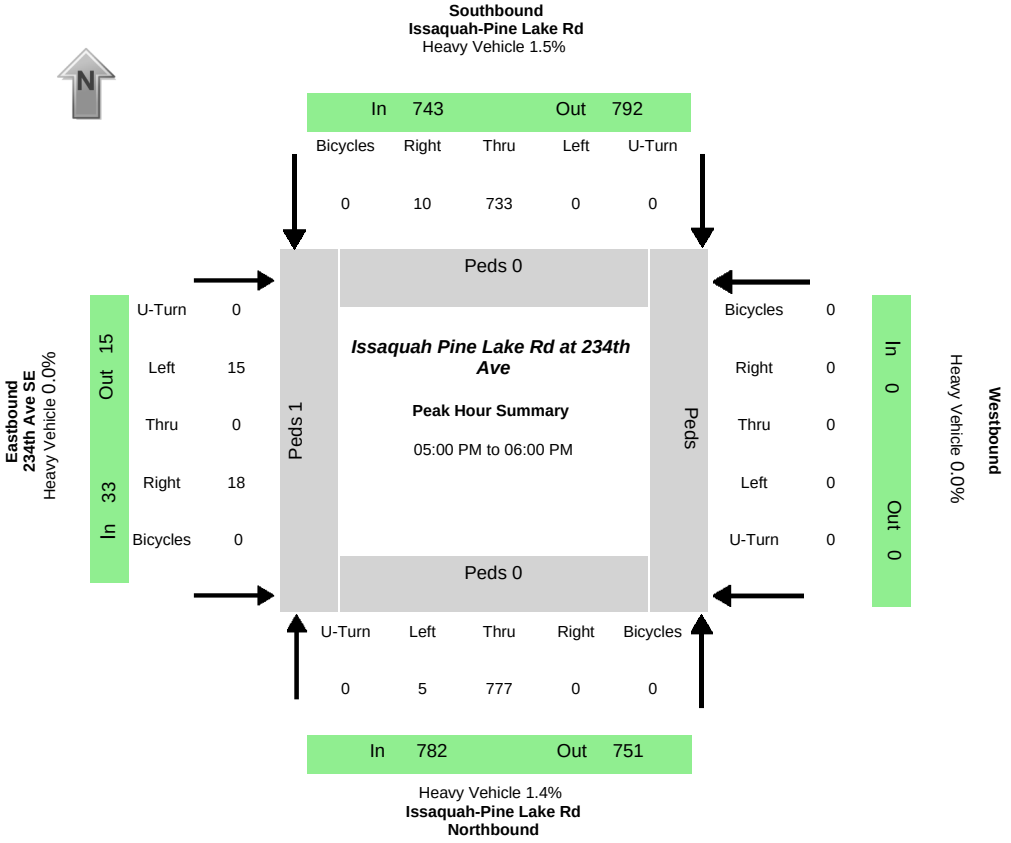
Percent Heavy Vehicles																								
0.0%	1.0%	0.0%	0.0%	0.0%	1.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.9%	1.3%	0.0%	0.0%	1.2%	1.0%	0.0%	0.0%	

PHV- Bicycles																	PHV - Pedestrians					
Northbound				Southbound				Eastbound				Westbound					in Crosswalk					
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum	NB	SB	EB	WB	Sum	
0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	2	0	4	1	1	6	

All Vehicle Volumes																		
	Northbound				Southbound				Eastbound				Westbound				15 Min	1 HR
	Issaquah-Pine Lake Rd				Issaquah-Pine Lake Rd				SE 47th Way				238th Way SE					
Time	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum	Sum
04:00:00 PM	0	66	4	0	2	60	0	0	0	0	0	0	4	0	1	0		
04:05:00 PM	1	61	7	0	2	64	1	0	0	0	0	0	3	0	1	0		
04:10:00 PM	0	68	9	0	4	55	0	0	0	0	0	0	4	0	1	0	418	
04:15:00 PM	1	71	7	0	0	61	1	0	0	0	1	0	5	0	1	0	429	
04:20:00 PM	0	56	6	0	0	51	0	0	0	0	3	0	5	0	2	0	412	
04:25:00 PM	0	60	7	0	0	63	1	0	1	0	0	0	2	0	1	0	406	
04:30:00 PM	2	65	8	0	2	47	0	0	0	0	0	0	6	0	2	0	390	
04:35:00 PM	1	80	6	0	1	67	0	0	1	0	2	0	6	0	3	0	434	
04:40:00 PM	0	78	5	0	3	72	0	0	0	0	1	0	5	0	3	0	466	
04:45:00 PM	0	71	4	0	0	72	0	0	0	0	1	0	2	0	2	0	486	
04:50:00 PM	1	97	3	0	2	61	1	0	0	0	1	0	1	0	0	0	486	
04:55:00 PM	0	80	5	0	1	53	1	0	0	0	0	0	0	0	3	0	462	1752
05:00:00 PM	1	92	7	0	2	60	0	0	0	0	0	0	3	0	2	0	477	1782
05:05:00 PM	1	91	4	0	1	82	0	0	0	0	1	0	7	0	3	0	500	1832
05:10:00 PM	2	86	13	0	2	59	1	0	1	0	0	0	5	0	1	0	527	1861
05:15:00 PM	1	87	9	0	1	63	0	0	0	0	0	0	3	0	1	0	525	1878
05:20:00 PM	2	99	6	0	1	53	0	0	0	0	1	0	4	0	4	0	505	1925
05:25:00 PM	1	87	13	0	1	71	0	0	0	0	0	0	5	0	3	0	516	1971
05:30:00 PM	1	79	10	0	1	42	0	0	0	1	0	0	10	0	4	0	499	1987
05:35:00 PM	3	92	15	0	2	78	1	0	0	0	1	0	7	0	4	0	532	2023
05:40:00 PM	1	91	3	0	2	56	1	0	2	0	3	0	8	0	2	0	520	2025
05:45:00 PM	2	89	8	0	2	69	0	0	1	0	0	0	4	0	2	0	549	2050
05:50:00 PM	0	82	10	0	1	50	0	0	0	0	1	0	5	0	2	0	497	2034
05:55:00 PM	0	100	12	0	2	47	0	0	1	0	1	0	2	0	1	0	494	2057

K-D-N
KEY DATA NETWORK

Data Provided by K-D-N.com 503-594-4224	
N/S street	*Issaquah-Pine Lake Rd*
E/W street	*234th Ave SE*
City, State	Samammish WA
Site Notes	
Location	47.578363 - -122.027013
Start Date	Thursday, May 17, 2018
Start Time	04:00:00 PM
Weather	
Study ID #	
Peak Hour Start	05:00:00 PM
Peak 15 Min Start	05:05:00 PM
PHF (15-Min Int)	0.94



Peak-Hour Volumes (PHV)

Northbound				Southbound				Eastbound				Westbound				Entering				Leaving			
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	NB	SB	EB	WB	NB	SB	EB	WB
5	777	0	0	0	733	10	0	15	0	18	0	0	0	0	0	782	743	33	0	751	792	15	0

Percent Heavy Vehicles

0.0%	1.4%	0.0%	0.0%	0.0%	1.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.4%	1.5%	0.0%	0.0%	1.5%	1.4%	0.0%	0.0%

PHV- Bicycles

Northbound				Southbound				Eastbound				Westbound				
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum
0	0		0		0	0	0	0		0	0					0

PHV - Pedestrians

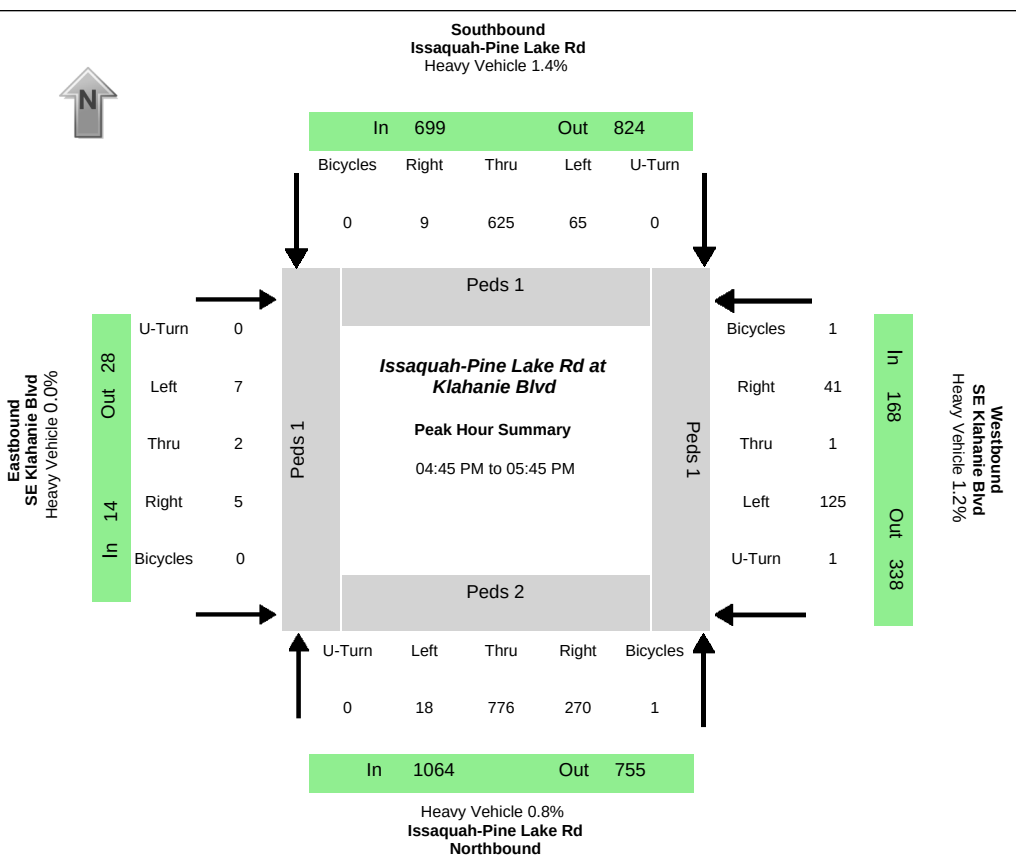
in Crosswalk				
NB	SB	EB	WB	Sum
0	0	1		1

All Vehicle Volumes

	Northbound Issaquah-Pine Lake Rd				Southbound Issaquah-Pine Lake Rd				Eastbound 234th Ave SE				Westbound				15 Min	1 HR
Time	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum	Sum
04:00:00 PM	0	53		0		58	0	0	0		1	0						
04:05:00 PM	0	62		0		57	1	0	0		3	0						
04:10:00 PM	0	47		0		48	1	0	2		0	0					333	
04:15:00 PM	0	54		0		64	1	0	0		0	0					340	
04:20:00 PM	2	37		0		60	1	0	0		1	0					318	
04:25:00 PM	3	38		0		52	0	0	2		1	0					316	
04:30:00 PM	0	60		0		53	2	0	0		0	0					312	
04:35:00 PM	1	47		0		66	1	0	0		1	0					327	
04:40:00 PM	1	56		0		62	0	0	1		2	0					353	
04:45:00 PM	0	74		0		70	1	0	0		1	0					384	
04:50:00 PM	0	55		0		51	0	0	3		3	0					380	
04:55:00 PM	1	62		0		53	2	0	3		0	0					379	1381
05:00:00 PM	1	57		0		64	0	0	0		1	0					356	1392
05:05:00 PM	0	76		0		67	2	0	0		0	0					389	1414
05:10:00 PM	1	60		0		67	2	0	1		0	0					399	1447
05:15:00 PM	0	77		0		58	1	0	2		0	0					414	1466
05:20:00 PM	0	60		0		60	1	0	2		7	0					399	1495
05:25:00 PM	1	56		0		62	1	0	1		1	0					390	1521
05:30:00 PM	0	70		0		53	0	0	2		1	0					378	1532
05:35:00 PM	0	58		0		63	0	0	2		1	0					372	1540
05:40:00 PM	1	69		0		57	0	0	0		3	0					380	1548
05:45:00 PM	1	55		0		64	3	0	3		2	0					382	1530
05:50:00 PM	0	61		0		58	0	0	1		1	0					379	1539
05:55:00 PM	0	78		0		60	0	0	1		1	0					389	1558

K-D-N
KEY DATA NETWORK

Data Provided by K-D-N.com 503-594-4224	
N/S street	*Issaquah-Pine Lake Rd*
E/W street	*SE Klahanie Blvd*
City, State	Samammish WA
Site Notes	
Location	47.567642 - -122.024804
Start Date	Thursday, May 17, 2018
Start Time	04:00:00 PM
Weather	
Study ID #	
Peak Hour Start	04:45:00 PM
Peak 15 Min Start	05:05:00 PM
PHF (15-Min Int)	0.96



Peak-Hour Volumes (PHV)																								
Northbound				Southbound				Eastbound				Westbound				Entering				Leaving				
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	NB	SB	EB	WB	NB	SB	EB	WB	
18	776	270	0	65	625	9	0	7	2	5	0	125	1	41	1	1064	699	14	168	755	824	28	338	

Percent Heavy Vehicles																								
0.0%	1.0%	0.0%	0.0%	1.5%	1.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.6%	0.0%	0.0%	0.0%	0.8%	1.4%	0.0%	1.2%	1.5%	1.0%	0.0%	0.3%	

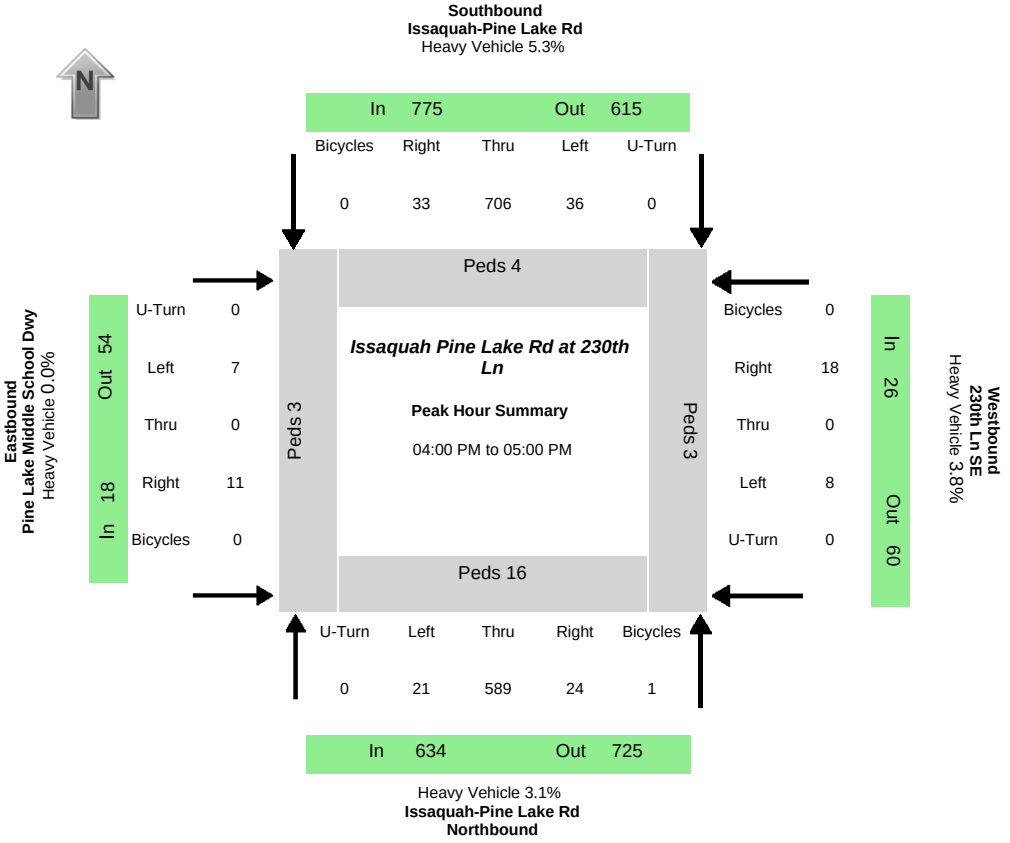
PHV- Bicycles																	PHV - Pedestrians					
Northbound				Southbound				Eastbound				Westbound					in Crosswalk					
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum	NB	SB	EB	WB	Sum	
0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	2	2	1	1	1	5	

All Vehicle Volumes

	Northbound Issaquah-Pine Lake Rd				Southbound Issaquah-Pine Lake Rd				Eastbound SE Klahanie Blvd				Westbound SE Klahanie Blvd				15 Min	1 HR
Time	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum	Sum
04:00:00 PM	0	49	15	0	7	46	0	0	0	0	2	0	8	0	7	0		
04:05:00 PM	0	49	10	0	6	48	1	0	0	0	0	0	13	0	4	0		
04:10:00 PM	0	44	9	0	1	49	0	0	1	0	1	0	15	0	2	0	387	
04:15:00 PM	0	56	24	0	5	45	0	0	0	0	2	0	11	0	2	0	398	
04:20:00 PM	1	37	15	0	2	52	1	0	0	0	1	0	6	0	4	0	386	
04:25:00 PM	4	51	10	0	8	58	0	0	0	0	0	0	7	0	7	0	409	
04:30:00 PM	0	40	12	0	6	39	1	0	0	0	0	0	10	0	3	0	375	
04:35:00 PM	0	64	21	0	5	57	0	0	1	0	1	0	12	0	4	0	421	
04:40:00 PM	3	61	14	0	3	56	0	0	0	0	0	0	8	1	1	0	423	
04:45:00 PM	1	59	20	0	3	61	0	0	1	0	1	0	8	0	4	0	470	
04:50:00 PM	2	66	16	0	8	51	1	0	1	0	1	0	9	0	4	0	464	
04:55:00 PM	1	56	24	0	6	49	0	0	0	0	0	0	11	0	5	0	469	1688
05:00:00 PM	2	70	15	0	4	53	2	0	0	0	1	0	6	0	3	0	467	1710
05:05:00 PM	2	65	29	0	5	61	0	0	0	1	0	0	19	0	5	0	495	1766
05:10:00 PM	2	66	18	0	5	58	0	0	2	0	0	0	6	0	0	0	500	1801
05:15:00 PM	0	62	27	0	7	46	0	0	1	0	1	0	12	0	5	0	505	1817
05:20:00 PM	3	68	36	0	5	51	2	0	1	0	1	0	5	0	3	0	493	1873
05:25:00 PM	0	62	17	0	6	52	0	0	0	0	0	0	13	0	5	0	491	1883
05:30:00 PM	4	65	20	0	4	46	2	0	0	0	0	0	7	1	1	0	480	1922
05:35:00 PM	1	56	23	0	7	50	1	0	1	1	0	0	16	0	4	0	465	1917
05:40:00 PM	0	81	25	0	5	47	1	0	0	0	0	0	13	0	2	1	485	1945
05:45:00 PM	1	55	22	0	4	54	1	0	0	0	0	0	11	0	6	0	489	1941
05:50:00 PM	2	54	24	0	4	46	1	0	0	0	1	0	7	0	7	0	475	1928
05:55:00 PM	2	63	25	0	6	45	1	0	1	1	0	0	10	0	5	0	459	1935

K-D-N
KEY DATA NETWORK

Data Provided by K-D-N.com 503-594-4224	
N/S street	*Issaquah-Pine Lake Rd*
E/W street	*Pine Lake Middle School Dwy*
City, State	Samammish WA
Site Notes	
Location	47.581037 - -122.032057
Start Date	Thursday, May 17, 2018
Start Time	04:00:00 PM
Weather	
Study ID #	
Peak Hour Start	04:00:00 PM
Peak 15 Min Start	04:05:00 PM
PHF (15-Min Int)	0.95



Peak-Hour Volumes (PHV)

Northbound				Southbound				Eastbound				Westbound				Entering				Leaving			
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	NB	SB	EB	WB	NB	SB	EB	WB
21	589	24	0	36	706	33	0	7	0	11	0	8	0	18	0	634	775	18	26	725	614	54	60

Percent Heavy Vehicles

0.0%	3.2%	4.2%	0.0%	2.8%	5.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	5.6%	0.0%	3.2%	5.3%	0.0%	3.8%	5.5%	3.3%	0.0%	3.3%

PHV- Bicycles

Northbound				Southbound				Eastbound				Westbound				
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum
0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1

PHV - Pedestrians

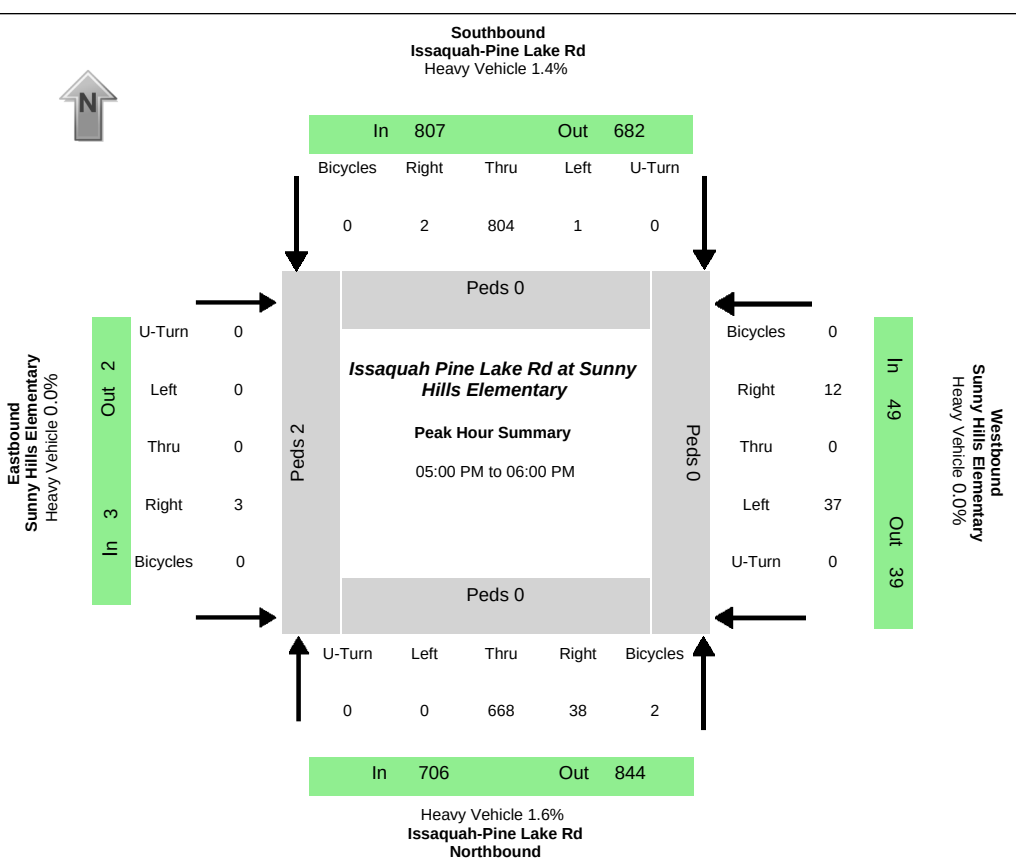
in Crosswalk				
NB	SB	EB	WB	Sum
16	4	3	3	26

All Vehicle Volumes

	Northbound Issaquah-Pine Lake Rd				Southbound Issaquah-Pine Lake Rd				Eastbound Pine Lake Middle School Dwy				Westbound 230th Ln SE				15 Min	1 HR
Time	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum	Sum
04:00:00 PM	2	48	1	0	1	51	7	0	0	0	0	0	0	0	2	0		
04:05:00 PM	4	54	1	0	4	60	6	0	0	0	1	0	1	0	1	0		
04:10:00 PM	3	48	2	0	1	55	5	0	1	0	0	0	0	0	1	0	360	
04:15:00 PM	4	48	2	0	2	67	7	0	1	0	1	0	1	0	1	0	382	
04:20:00 PM	2	36	2	0	3	71	3	0	0	0	2	0	0	0	3	0	372	
04:25:00 PM	2	41	2	0	3	50	2	0	3	0	0	0	0	0	1	0	360	
04:30:00 PM	3	41	3	0	0	60	1	0	0	0	2	0	0	0	4	0	340	
04:35:00 PM	1	50	2	0	1	49	1	0	0	0	2	0	2	0	1	0	327	
04:40:00 PM	0	59	3	0	7	73	0	0	1	0	2	0	1	0	2	0	371	
04:45:00 PM	0	54	5	0	2	62	0	0	0	0	1	0	0	0	1	0	382	
04:50:00 PM	0	50	0	0	5	44	0	0	1	0	0	0	2	0	1	0	376	
04:55:00 PM	0	60	1	0	7	64	1	0	0	0	0	0	1	0	0	0	362	1453
05:00:00 PM	0	47	3	0	0	68	0	0	0	0	1	0	4	0	2	0	349	1453
05:05:00 PM	0	60	0	0	2	70	0	0	1	0	2	0	0	0	2	0	320	1395
05:10:00 PM	1	54	1	0	6	68	1	0	0	0	2	0	6	0	3	0	286	1379
05:15:00 PM	1	72	3	0	3	64	3	0	1	0	1	0	2	0	0	0	303	1374
05:20:00 PM	0	39	2	0	2	68	1	0	2	0	1	0	3	0	4	0	342	1365
05:25:00 PM	0	44	4	0	2	80	0	0	2	0	1	0	1	0	4	0	380	1399
05:30:00 PM	2	58	4	0	2	62	1	1	0	0	2	0	0	0	3	0	386	1420
05:35:00 PM	0	52	3	0	5	66	0	0	0	0	2	0	0	0	4	0	405	1443
05:40:00 PM	0	69	0	0	5	65	0	0	0	0	0	0	2	0	1	0	409	1437
05:45:00 PM	0	44	0	0	7	62	2	0	0	0	0	0	0	0	1	0	390	1428
05:50:00 PM	0	52	1	0	3	12	0	0	2	0	0	0	0	0	4	0	332	1399
05:55:00 PM	2	59	2	0	6	61	4	0	0	0	1	0	1	0	2	0	328	1403

K-D-N
KEY DATA NETWORK

Data Provided by K-D-N.com 503-594-4224	
N/S street	*Issaquah-Pine Lake Rd*
E/W street	*Sunny Hills Elementary*
City, State	Samammish WA
Site Notes	
Location	47.579909 - -122.030087
Start Date	Thursday, May 17, 2018
Start Time	04:00:00 PM
Weather	
Study ID #	
Peak Hour Start	05:00:00 PM
Peak 15 Min Start	05:35:00 PM
PHF (15-Min Int)	0.95



Peak-Hour Volumes (PHV)

Northbound				Southbound				Eastbound				Westbound				Entering				Leaving			
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	NB	SB	EB	WB	NB	SB	EB	WB
0	668	38	0	1	804	2	0	0	0	3	0	37	0	12	0	706	807	3	49	844	680	2	39

Percent Heavy Vehicles

0.0%	1.6%	0.0%	0.0%	0.0%	1.2%	50.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.6%	1.4%	0.0%	0.0%	1.2%	1.6%	50.0%	0.0%

PHV- Bicycles

Northbound				Southbound				Eastbound				Westbound				
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum
0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2

PHV - Pedestrians

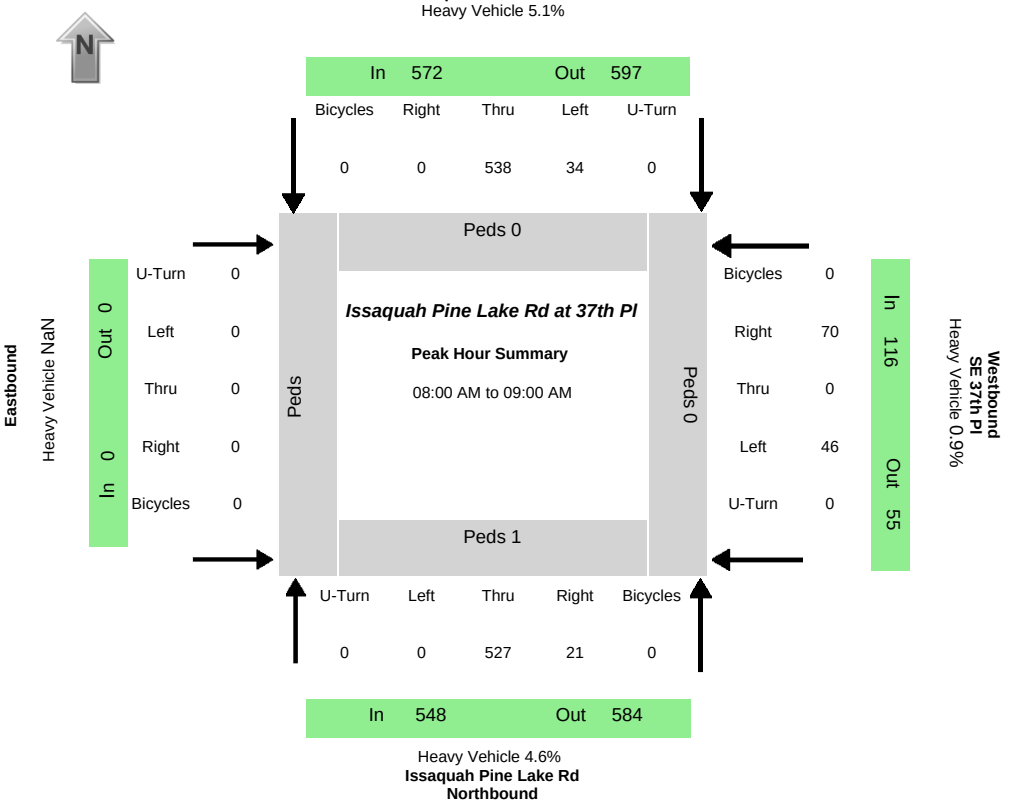
in Crosswalk				
NB	SB	EB	WB	Sum
0	0	2	0	2

All Vehicle Volumes

	Northbound Issaquah-Pine Lake Rd				Southbound Issaquah-Pine Lake Rd				Eastbound Sunny Hills Elementary				Westbound Sunny Hills Elementary				15 Min	1 HR
Time	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum	Sum
04:00:00 PM	0	52	4	0	0	59	3	0	0	0	0	0	11	0	2	0		
04:05:00 PM	0	55	0	0	0	54	7	0	0	0	0	0	7	0	3	0		
04:10:00 PM	0	50	2	0	0	39	10	0	0	0	2	0	2	0	2	0	364	
04:15:00 PM	0	52	2	0	0	69	3	0	0	0	3	0	1	0	1	0	364	
04:20:00 PM	0	40	2	0	0	70	0	0	0	0	0	0	3	0	3	0	356	
04:25:00 PM	0	46	3	0	0	52	1	0	0	0	2	0	0	0	0	0	353	
04:30:00 PM	0	45	7	0	0	59	1	0	0	0	1	0	4	0	2	0	341	
04:35:00 PM	0	47	8	0	0	58	1	0	0	0	0	0	3	0	3	0	343	
04:40:00 PM	0	63	1	0	0	68	2	0	0	0	0	0	3	0	2	0	378	
04:45:00 PM	0	55	5	0	0	60	2	0	0	0	0	0	2	0	2	0	385	
04:50:00 PM	0	54	1	0	0	51	0	0	0	0	0	0	7	0	2	0	380	
04:55:00 PM	0	56	5	0	0	64	0	0	0	0	1	0	2	0	2	0	371	1466
05:00:00 PM	0	46	4	0	0	71	1	0	0	0	1	0	3	0	2	0	373	1463
05:05:00 PM	0	61	1	0	0	62	1	0	0	0	0	0	4	0	2	0	389	1468
05:10:00 PM	0	56	4	0	0	55	0	0	0	0	1	0	3	0	1	0	379	1481
05:15:00 PM	0	71	2	0	0	61	0	0	0	0	0	0	4	0	1	0	390	1489
05:20:00 PM	0	40	3	0	0	62	0	0	0	0	0	0	4	0	1	0	369	1481
05:25:00 PM	0	47	4	0	1	81	0	0	0	0	0	0	2	0	0	0	384	1512
05:30:00 PM	0	64	3	0	0	63	0	0	0	0	0	0	1	0	1	0	377	1525
05:35:00 PM	0	59	3	0	0	71	0	0	0	0	0	0	4	0	1	0	405	1543
05:40:00 PM	0	65	5	0	0	67	0	0	0	0	0	0	0	0	2	0	409	1543
05:45:00 PM	0	46	2	0	0	82	0	0	0	0	1	0	5	0	0	0	413	1553
05:50:00 PM	0	52	4	0	0	58	0	0	0	0	0	0	4	0	1	0	394	1557
05:55:00 PM	0	61	3	0	0	71	0	0	0	0	0	0	3	0	0	0	393	1565

K-D-N
KEY DATA NETWORK

Data Provided by K-D-N.com 503-594-4224	
N/S street	*Issaquah Pine Lake Rd*
E/W street	*SE 37th Pl*
City, State	Samammish WA
Site Notes	
Location	47.574969 - -122.022289
Start Date	Thursday, May 17, 2018
Start Time	07:00:00 AM
Weather	
Study ID #	
Peak Hour Start	08:00:00 AM
Peak 15 Min Start	08:45:00 AM
PHF (15-Min Int)	0.85



Peak-Hour Volumes (PHV)

Northbound				Southbound				Eastbound				Westbound				Entering				Leaving			
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	NB	SB	EB	WB	NB	SB	EB	WB
0	527	21	0	34	538	0	0	0	0	0	0	46	0	70	0	548	572	0	116	584	597	0	55

Percent Heavy Vehicles

0.0%	4.7%	0.0%	0.0%	5.9%	5.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.4%	0.0%	4.6%	5.1%	NaN	0.9%	4.6%	4.4%	NaN	3.6%

PHV- Bicycles

Northbound				Southbound				Eastbound				Westbound				
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum
	0	0	0	0	0		0					0		0	0	0

PHV - Pedestrians

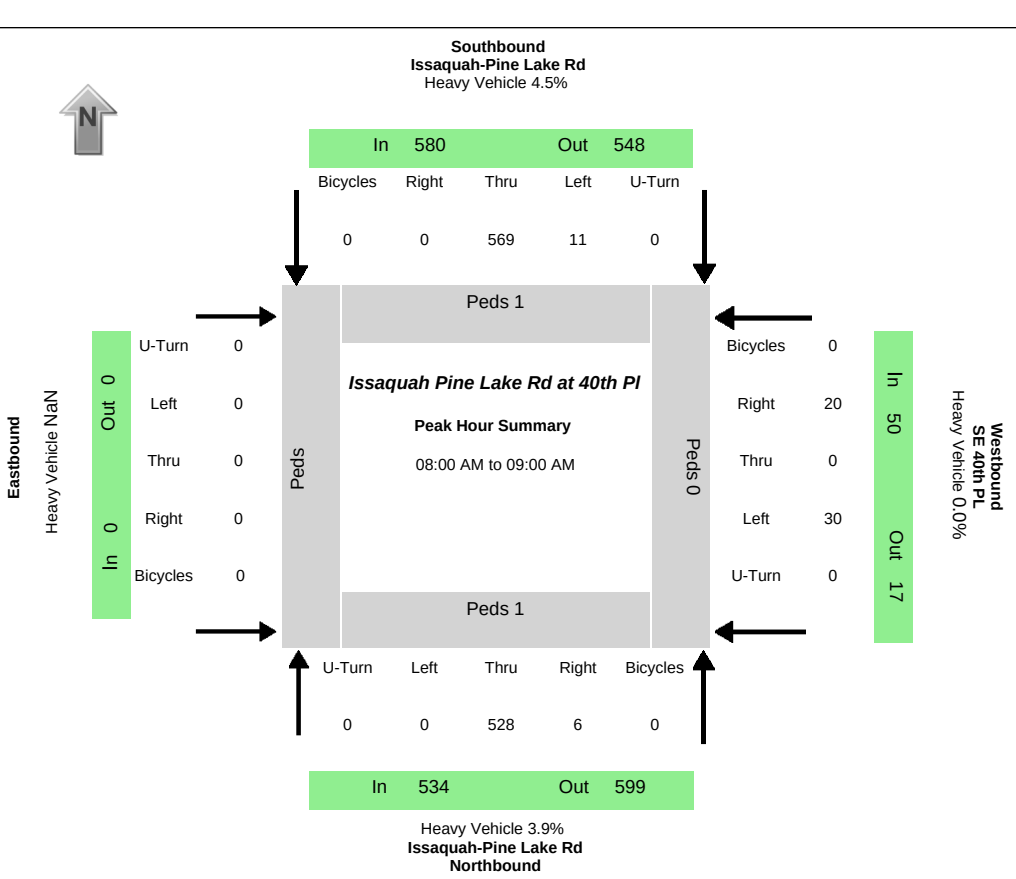
in Crosswalk				
NB	SB	EB	WB	Sum
1	0		0	1

All Vehicle Volumes

	Northbound Issaquah Pine Lake Rd				Southbound Issaquah Pine Lake Rd				Eastbound				Westbound SE 37th Pl				15 Min	1 HR
Time	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum	Sum
07:00:00 AM		32	0	0	0	34		0					3		8	0		
07:05:00 AM		27	0	0	3	43		0					9		8	0		
07:10:00 AM		32	0	0	2	31		0					4		4	0	240	
07:15:00 AM		42	1	0	2	50		0					4		3	0	265	
07:20:00 AM		28	1	0	0	32		0					4		3	0	243	
07:25:00 AM		32	0	0	0	34		0					2		8	0	246	
07:30:00 AM		39	0	0	1	42		0					2		5	0	233	
07:35:00 AM		40	0	0	0	39		0					6		7	0	257	
07:40:00 AM		47	2	0	0	46		0					5		12	0	293	
07:45:00 AM		39	0	0	1	42		0					10		15	0	311	
07:50:00 AM		46	3	0	1	46		0					6		10	0	331	
07:55:00 AM		40	0	0	5	53		0					3		11	0	331	1110
08:00:00 AM		46	4	0	3	44		0					4		6	0	331	1140
08:05:00 AM		43	1	0	5	59		0					4		4	0	335	1166
08:10:00 AM		30	1	0	3	43		0					1		7	0	308	1178
08:15:00 AM		36	1	0	2	45		0					4		8	0	297	1172
08:20:00 AM		33	1	0	2	50		0					3		4	0	274	1197
08:25:00 AM		45	0	0	2	38		0					2		4	0	280	1212
08:30:00 AM		31	2	0	0	42		0					4		3	0	266	1205
08:35:00 AM		35	1	0	0	42		0					2		4	0	257	1197
08:40:00 AM		51	1	0	4	47		0					7		9	0	285	1204
08:45:00 AM		58	1	0	3	38		0					3		2	0	308	1202
08:50:00 AM		53	6	0	4	39		0					4		10	0	340	1206
08:55:00 AM		66	2	0	6	51		0					8		9	0	363	1236

K-D-N
KEY DATA NETWORK

Data Provided by K-D-N.com 503-594-4224	
N/S street	*Issaquah-Pine Lake Rd*
E/W street	*SE 40th PL*
City, State	Samammish WA
Site Notes	
Location	47.572275 - -122.022233
Start Date	Thursday, May 17, 2018
Start Time	07:00:00 AM
Weather	
Study ID #	
Peak Hour Start	08:00:00 AM
Peak 15 Min Start	08:45:00 AM
PHF (15-Min Int)	0.86



Peak-Hour Volumes (PHV)

Northbound				Southbound				Eastbound				Westbound				Entering				Leaving			
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	NB	SB	EB	WB	NB	SB	EB	WB
0	528	6	0	11	569	0	0	0	0	0	0	30	0	20	0	534	580	0	50	599	548	0	17

Percent Heavy Vehicles

0.0%	3.8%	16.7%	0.0%	0.0%	4.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	3.9%	4.5%	NaN	0.0%	4.3%	3.6%	NaN	5.9%

PHV- Bicycles

Northbound				Southbound				Eastbound				Westbound				
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum
	0	0	0	0	0		0					0		0	0	0

PHV - Pedestrians

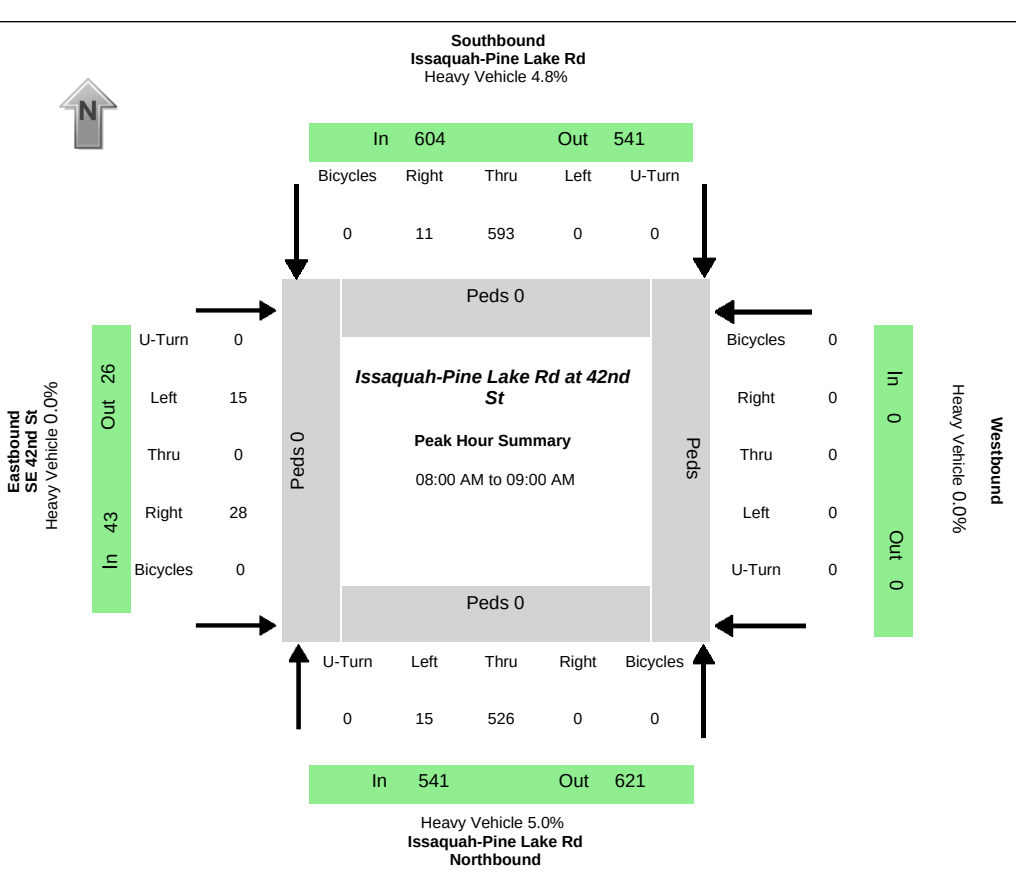
in Crosswalk				
NB	SB	EB	WB	Sum
1	1		0	2

All Vehicle Volumes

	Northbound Issaquah-Pine Lake Rd				Southbound Issaquah-Pine Lake Rd				Eastbound				Westbound SE 40th PL				15 Min	1 HR
Time	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum	Sum
07:00:00 AM		30	1	0	1	34		0					1		2	0		
07:05:00 AM		25	0	0	0	51		0					4		3	0		
07:10:00 AM		31	1	0	1	33		0					3		1	0	222	
07:15:00 AM		38	1	0	1	53		0					1		2	0	249	
07:20:00 AM		29	0	0	0	35		0					4		0	0	234	
07:25:00 AM		29	0	0	1	41		0					2		2	0	239	
07:30:00 AM		37	0	0	0	41		0					2		2	0	225	
07:35:00 AM		42	1	0	1	46		0					2		1	0	250	
07:40:00 AM		42	0	0	0	40		0					1		4	0	262	
07:45:00 AM		37	1	0	0	62		0					5		6	0	291	
07:50:00 AM		40	0	0	1	47		0					3		5	0	294	
07:55:00 AM		39	0	0	1	56		0					1		4	0	308	1031
08:00:00 AM		45	0	0	3	44		0					2		2	0	293	1058
08:05:00 AM		46	0	0	3	60		0					5		0	0	311	1089
08:10:00 AM		27	1	0	0	43		0					3		2	0	286	1095
08:15:00 AM		36	0	0	0	47		0					1		0	0	274	1083
08:20:00 AM		38	0	0	1	54		0					1		0	0	254	1109
08:25:00 AM		42	0	0	1	38		0					1		2	0	262	1118
08:30:00 AM		31	0	0	1	45		0					1		2	0	258	1116
08:35:00 AM		36	1	0	1	46		0					2		1	0	251	1110
08:40:00 AM		51	2	0	0	53		0					4		1	0	278	1134
08:45:00 AM		58	1	0	0	43		0					2		4	0	306	1131
08:50:00 AM		58	1	0	0	41		0					4		2	0	325	1141
08:55:00 AM		60	0	0	1	55		0					4		4	0	338	1164

K-D-N
KEY DATA NETWORK

Data Provided by K-D-N.com 503-594-4224	
N/S street	*Issaquah-Pine Lake Rd*
E/W street	*SE 42nd St*
City, State	Samammish WA
Site Notes	
Location	47.569854 - -122.023593
Start Date	Thursday, May 17, 2018
Start Time	07:00:00 AM
Weather	
Study ID #	
Peak Hour Start	08:00:00 AM
Peak 15 Min Start	08:45:00 AM
PHF (15-Min Int)	0.85



Peak-Hour Volumes (PHV)

Northbound				Southbound				Eastbound				Westbound				Entering				Leaving			
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	NB	SB	EB	WB	NB	SB	EB	WB
15	526	0	0	0	593	11	0	15	0	28	0	0	0	0	0	541	604	43	0	621	541	26	0

Percent Heavy Vehicles

6.7%	4.9%	0.0%	0.0%	0.0%	4.4%	27.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	5.0%	4.8%	0.0%	0.0%	4.2%	4.8%	15.4%	0.0%

PHV- Bicycles

Northbound				Southbound				Eastbound				Westbound				
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum
0	0		0		0	0	0	0		0	0					0

PHV - Pedestrians

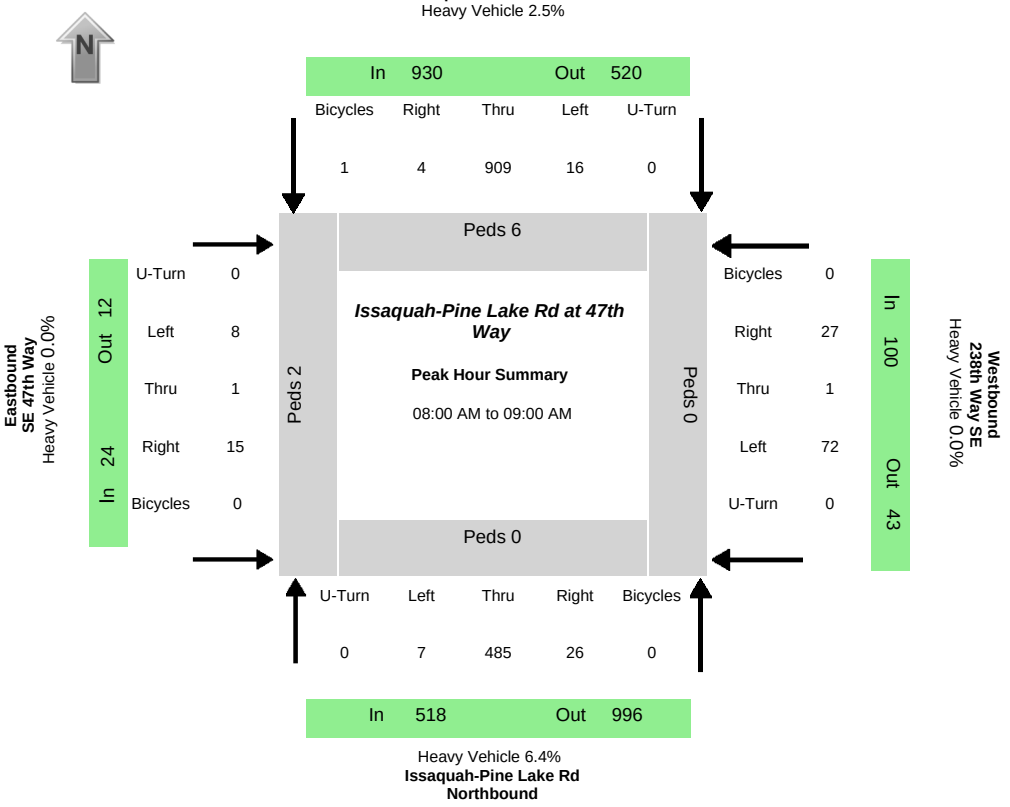
in Crosswalk					
NB	SB	EB	WB	Sum
0	0	0		0

All Vehicle Volumes

	Northbound Issaquah-Pine Lake Rd				Southbound Issaquah-Pine Lake Rd				Eastbound SE 42nd St				Westbound				15 Min	1 HR
Time	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum	Sum
07:00:00 AM	0	29		0		33	0	0	2		2	0						
07:05:00 AM	0	21		0		54	0	0	1		0	0						
07:10:00 AM	0	32		0		36	2	0	1		2	0					215	
07:15:00 AM	1	38		0		53	1	0	1		0	0					243	
07:20:00 AM	0	33		0		39	0	0	0		3	0					242	
07:25:00 AM	0	26		0		43	0	0	0		1	0					239	
07:30:00 AM	2	40		0		44	0	0	1		2	0					234	
07:35:00 AM	1	38		0		45	1	0	1		0	0					245	
07:40:00 AM	2	43		0		41	0	0	0		1	0					262	
07:45:00 AM	1	36		0		66	0	0	1		1	0					278	
07:50:00 AM	1	42		0		47	0	0	3		1	0					286	
07:55:00 AM	0	33		0		57	1	0	4		2	0					296	1012
08:00:00 AM	0	44		0		50	0	0	3		1	0					289	1044
08:05:00 AM	2	40		0		60	1	0	2		2	0					302	1075
08:10:00 AM	0	30		0		44	2	0	0		1	0					282	1079
08:15:00 AM	3	35		0		50	1	0	0		3	0					276	1077
08:20:00 AM	1	39		0		56	1	0	2		1	0					269	1102
08:25:00 AM	0	38		0		39	1	0	0		2	0					272	1112
08:30:00 AM	2	31		0		42	0	0	0		3	0					258	1101
08:35:00 AM	2	42		0		50	1	0	1		2	0					256	1113
08:40:00 AM	1	46		0		58	0	0	1		4	0					286	1136
08:45:00 AM	0	66		0		45	0	0	1		4	0					324	1147
08:50:00 AM	2	60		0		42	0	0	1		4	0					335	1162
08:55:00 AM	2	55		0		57	4	0	4		1	0					348	1188

K-D-N
KEY DATA NETWORK

Data Provided by K-D-N.com 503-594-4224	
N/S street	*Issaquah-Pine Lake Rd*
E/W street	*SE 47th Way*
City, State	Samammish WA
Site Notes	
Location	47.561358 - -122.02511
Start Date	Thursday, May 17, 2018
Start Time	07:00:00 AM
Weather	
Study ID #	
Peak Hour Start	08:00:00 AM
Peak 15 Min Start	08:40:00 AM
PHF (15-Min Int)	0.96



Peak-Hour Volumes (PHV)																								
Northbound				Southbound				Eastbound				Westbound				Entering				Leaving				
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	NB	SB	EB	WB	NB	SB	EB	WB	
7	485	26	0	16	909	4	0	8	1	15	0	72	1	27	0	518	929	24	100	996	520	12	43	
Percent Heavy Vehicles																								
0.0%	6.6%	3.8%	0.0%	18.8%	2.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	6.4%	2.5%	0.0%	0.0%	2.0%	6.2%	0.0%	9.3%	

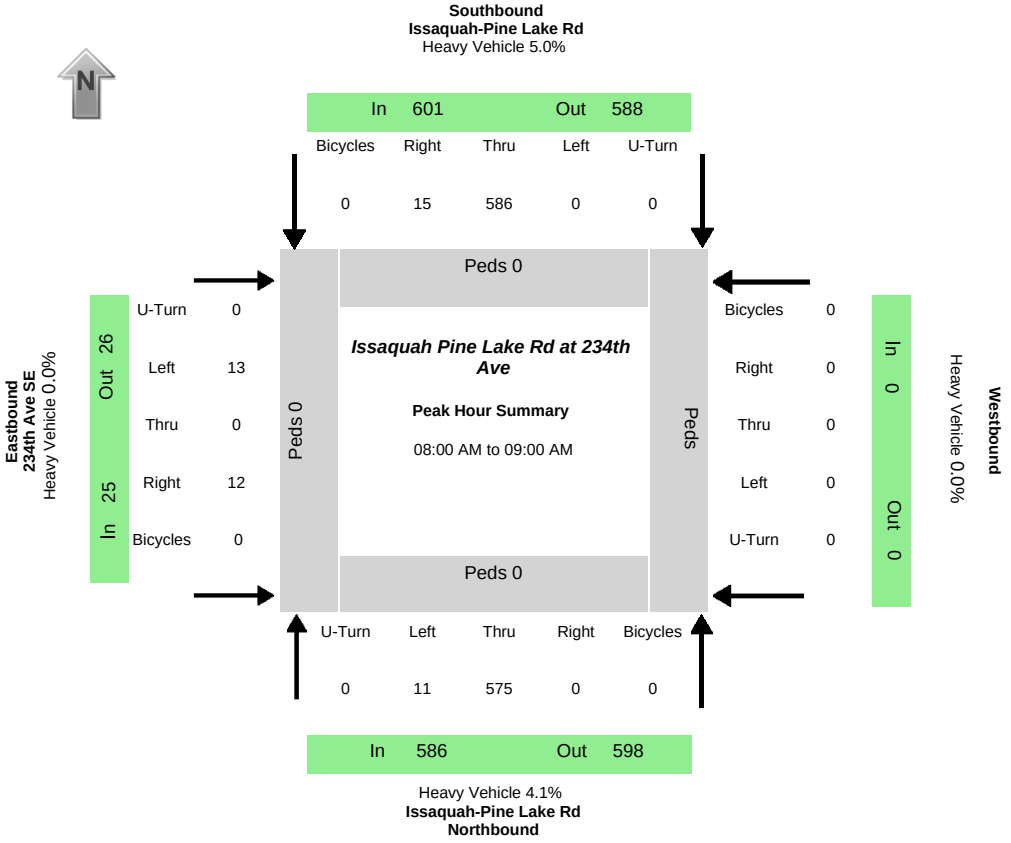
PHV- Bicycles																	PHV - Pedestrians					
Northbound				Southbound				Eastbound				Westbound					in Crosswalk				
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum	NB	SB	EB	WB	Sum
0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	6	2	0	8

All Vehicle Volumes

	Northbound Issaquah-Pine Lake Rd				Southbound Issaquah-Pine Lake Rd				Eastbound SE 47th Way				Westbound 238th Way SE				15 Min	1 HR
Time	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum	Sum
07:00:00 AM	0	27	1	0	1	59	0	0	0	0	3	0	11	0	0	0		
07:05:00 AM	0	29	0	0	1	72	0	0	0	0	0	0	12	0	1	0		
07:10:00 AM	0	25	0	0	1	59	0	0	0	1	1	0	14	1	2	0	321	
07:15:00 AM	0	47	2	0	0	73	0	0	0	0	2	0	8	0	1	0	352	
07:20:00 AM	0	30	2	0	1	78	0	0	0	0	0	0	6	0	2	0	356	
07:25:00 AM	0	20	4	0	1	86	0	0	0	0	2	0	8	0	1	0	374	
07:30:00 AM	1	37	3	0	0	66	0	0	0	0	0	0	8	0	2	0	358	
07:35:00 AM	0	29	0	0	0	74	0	0	0	0	2	0	9	0	2	0	355	
07:40:00 AM	0	39	0	0	1	75	0	0	0	0	0	0	19	0	2	0	369	
07:45:00 AM	1	38	6	0	0	86	1	0	0	0	1	0	8	0	0	0	393	
07:50:00 AM	0	28	1	0	0	82	0	0	2	0	0	0	12	0	1	0	403	
07:55:00 AM	0	26	4	0	0	77	1	0	1	0	3	0	5	1	2	0	387	1451
08:00:00 AM	0	35	3	0	0	85	0	0	0	1	0	0	6	0	2	0	378	1481
08:05:00 AM	0	41	4	0	1	87	0	0	2	0	1	0	8	0	0	0	396	1510
08:10:00 AM	0	28	2	0	0	90	1	0	0	0	2	0	5	0	2	0	406	1536
08:15:00 AM	1	38	2	0	1	68	0	0	0	0	1	0	4	0	4	0	393	1522
08:20:00 AM	0	37	1	0	2	93	0	0	1	0	0	0	2	0	2	0	387	1541
08:25:00 AM	1	39	2	0	1	68	0	0	0	0	2	0	10	0	1	0	381	1543
08:30:00 AM	1	38	3	0	2	62	0	0	1	0	1	0	7	0	2	0	379	1543
08:35:00 AM	1	34	1	0	1	68	2	0	1	0	3	0	7	0	1	0	360	1546
08:40:00 AM	0	55	3	0	2	71	0	0	0	0	0	0	5	0	2	0	374	1548
08:45:00 AM	0	43	1	0	1	68	0	0	1	0	3	0	10	1	3	0	388	1538
08:50:00 AM	0	63	1	0	3	62	1	0	1	0	2	0	4	0	4	0	410	1553
08:55:00 AM	3	34	3	0	2	87	0	0	1	0	0	0	4	0	4	0	410	1571

K-D-N
KEY DATA NETWORK

Data Provided by K-D-N.com 503-594-4224	
N/S street	*Issaquah-Pine Lake Rd*
E/W street	*234th Ave SE*
City, State	Samammish WA
Site Notes	
Location	47.578363 - -122.027013
Start Date	Thursday, May 17, 2018
Start Time	07:00:00 AM
Weather	
Study ID #	
Peak Hour Start	08:00:00 AM
Peak 15 Min Start	08:45:00 AM
PHF (15-Min Int)	0.82



Peak-Hour Volumes (PHV)																								
Northbound				Southbound				Eastbound				Westbound				Entering				Leaving				
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	NB	SB	EB	WB	NB	SB	EB	WB	
11	575	0	0	0	586	15	0	13	0	12	0	0	0	0	0	586	601	25	0	598	588	26	0	

Percent Heavy Vehicles																								
0.0%	4.2%	0.0%	0.0%	0.0%	5.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	4.1%	5.0%	0.0%	0.0%	5.0%	4.1%	0.0%	0.0%	

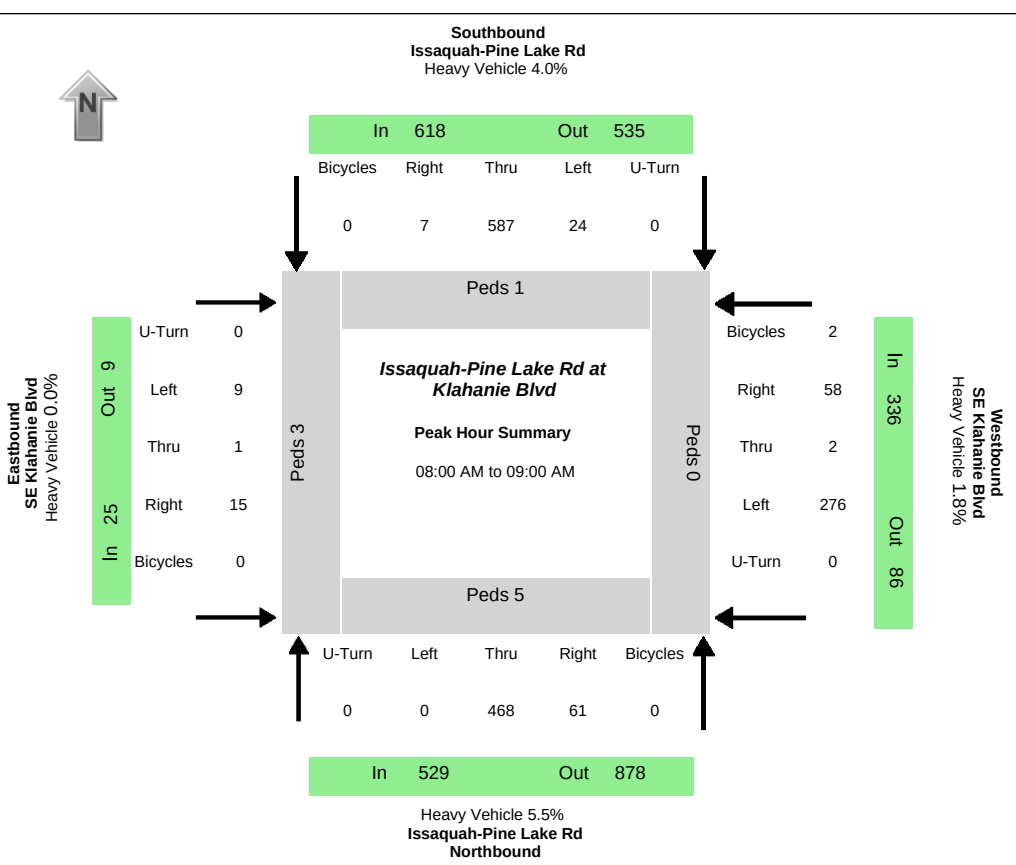
PHV- Bicycles																	PHV - Pedestrians					
Northbound				Southbound				Eastbound				Westbound					in Crosswalk					
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum	NB	SB	EB	WB	Sum	
0	0		0		0	0	0	0		0	0					0	0	0	0		0	

All Vehicle Volumes

	Northbound Issaquah-Pine Lake Rd				Southbound Issaquah-Pine Lake Rd				Eastbound 234th Ave SE				Westbound				15 Min	1 HR
Time	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum	Sum
07:00:00 AM	1	39		0		33	2	0	0		1	0						
07:05:00 AM	0	30		0		45	0	0	2		0	0						
07:10:00 AM	0	38		0		34	1	0	0		0	0					226	
07:15:00 AM	1	41		0		50	1	0	0		0	0					243	
07:20:00 AM	0	35		0		31	0	0	0		0	0					232	
07:25:00 AM	0	35		0		36	1	0	0		0	0					231	
07:30:00 AM	0	36		0		38	1	0	0		1	0					214	
07:35:00 AM	0	56		0		38	2	0	0		2	0					246	
07:40:00 AM	0	55		0		45	0	0	0		0	0					274	
07:45:00 AM	1	58		0		44	2	0	2		0	0					305	
07:50:00 AM	1	60		0		47	1	0	1		2	0					319	
07:55:00 AM	1	47		0		63	1	0	1		3	0					335	1066
08:00:00 AM	1	47		0		49	2	0	2		0	0					329	1091
08:05:00 AM	0	53		0		60	1	0	1		1	0					333	1130
08:10:00 AM	0	39		0		45	1	0	0		0	0					302	1142
08:15:00 AM	1	35		0		43	2	0	0		0	0					282	1130
08:20:00 AM	1	40		0		54	1	0	2		1	0					265	1163
08:25:00 AM	1	46		0		38	0	0	0		1	0					266	1177
08:30:00 AM	0	29		0		37	1	0	0		0	0					252	1168
08:35:00 AM	0	49		0		53	2	0	0		0	0					257	1174
08:40:00 AM	3	48		0		49	1	0	0		1	0					273	1176
08:45:00 AM	3	66		0		42	0	0	2		3	0					322	1185
08:50:00 AM	1	66		0		58	3	0	2		4	0					352	1207
08:55:00 AM	0	57		0		58	1	0	4		1	0					371	1212

K-D-N
KEY DATA NETWORK

Data Provided by K-D-N.com 503-594-4224	
N/S street	*Issaquah-Pine Lake Rd*
E/W street	*SE Klahanie Blvd*
City, State	Samammish WA
Site Notes	
Location	47.567642 - -122.024804
Start Date	Thursday, May 17, 2018
Start Time	07:00:00 AM
Weather	
Study ID #	
Peak Hour Start	08:00:00 AM
Peak 15 Min Start	08:45:00 AM
PHF (15-Min Int)	0.91



Peak-Hour Volumes (PHV)

Northbound				Southbound				Eastbound				Westbound				Entering				Leaving			
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	NB	SB	EB	WB	NB	SB	EB	WB
0	468	61	0	24	587	7	0	9	1	15	0	276	2	58	0	529	618	25	336	878	535	9	86

Percent Heavy Vehicles

0.0%	4.5%	13.1%	0.0%	8.3%	3.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	10.3%	0.0%	5.5%	4.0%	0.0%	1.8%	2.6%	5.0%	0.0%	11.6%

PHV- Bicycles

Northbound				Southbound				Eastbound				Westbound				
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	**Sum**
0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2

PHV - Pedestrians

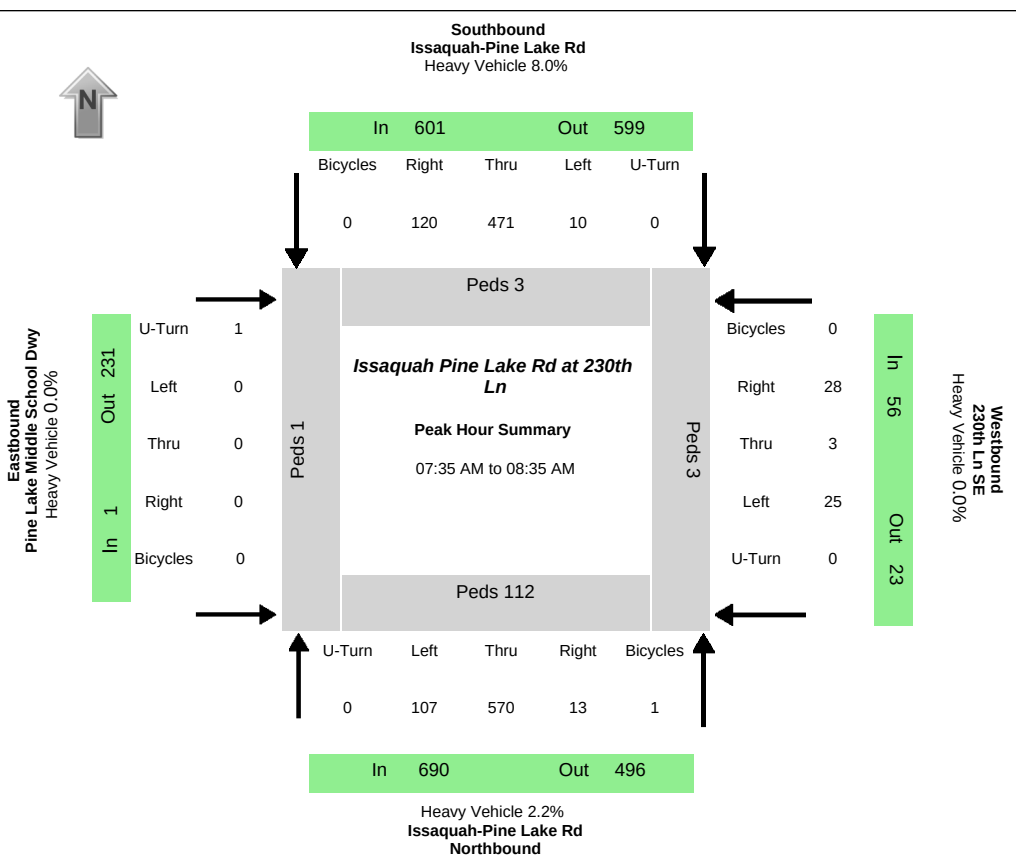
in Crosswalk				
NB	SB	EB	WB	**Sum**
5	1	3	0	9

All Vehicle Volumes

	Northbound Issaquah-Pine Lake Rd				Southbound Issaquah-Pine Lake Rd				Eastbound SE Klahanie Blvd				Westbound SE Klahanie Blvd				15 Min	1 HR
Time	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum	Sum
07:00:00 AM	0	25	7	0	1	30	0	0	1	0	5	0	19	0	3	0		
07:05:00 AM	0	22	7	0	1	56	0	0	1	0	2	0	22	0	3	0		
07:10:00 AM	1	25	6	0	3	38	0	0	0	0	2	0	18	0	2	0	300	
07:15:00 AM	0	35	7	0	2	49	0	0	1	0	0	0	20	0	3	0	326	
07:20:00 AM	0	31	5	0	2	38	0	0	0	0	3	0	25	0	2	0	318	
07:25:00 AM	0	22	3	0	1	48	0	0	0	0	2	0	35	0	6	0	340	
07:30:00 AM	1	32	3	0	1	37	0	0	0	1	1	0	27	0	9	0	335	
07:35:00 AM	0	33	4	0	3	46	0	0	0	0	0	0	21	0	6	0	342	
07:40:00 AM	0	29	7	0	0	46	0	0	0	0	0	0	34	0	16	0	357	
07:45:00 AM	0	35	2	0	1	60	0	0	1	0	0	0	25	0	2	0	371	
07:50:00 AM	0	37	4	0	1	52	0	0	1	0	0	0	27	0	8	0	388	
07:55:00 AM	0	27	1	0	2	55	2	0	2	0	1	0	29	0	3	1	379	1376
08:00:00 AM	0	37	3	0	0	49	0	0	3	0	3	0	29	0	2	0	379	1411
08:05:00 AM	0	37	5	0	2	55	2	0	0	0	0	0	37	0	4	0	391	1439
08:10:00 AM	0	27	3	0	1	49	1	0	0	0	4	0	29	0	5	0	387	1463
08:15:00 AM	0	31	9	0	2	44	0	0	0	0	3	0	31	1	5	0	387	1472
08:20:00 AM	0	36	5	0	3	49	0	0	1	0	0	0	18	0	3	0	360	1481
08:25:00 AM	0	35	5	0	2	49	1	0	0	0	2	0	13	0	6	0	354	1477
08:30:00 AM	0	25	8	0	0	42	1	0	1	0	0	0	18	0	5	0	328	1465
08:35:00 AM	0	45	0	0	2	52	0	0	1	0	0	0	16	1	3	0	333	1472
08:40:00 AM	0	43	5	0	4	57	0	0	1	0	0	0	19	0	4	0	353	1473
08:45:00 AM	0	51	6	0	1	43	2	0	0	0	2	0	15	0	9	0	382	1476
08:50:00 AM	0	53	9	0	3	43	0	0	1	0	0	0	20	0	8	0	399	1483
08:55:00 AM	0	48	3	0	4	55	0	0	1	1	1	0	31	0	4	0	414	1508

K-D-N
KEY DATA NETWORK

Data Provided by K-D-N.com 503-594-4224	
N/S street	*Issaquah-Pine Lake Rd*
E/W street	*Pine Lake Middle School Dwy*
City, State	Samammish WA
Site Notes	
Location	47.581037 - -122.032057
Start Date	Thursday, May 17, 2018
Start Time	07:00:00 AM
Weather	
Study ID #	
Peak Hour Start	07:35:00 AM
Peak 15 Min Start	07:45:00 AM
PHF (15-Min Int)	0.84



Peak-Hour Volumes (PHV)

Northbound				Southbound				Eastbound				Westbound				Entering				Leaving			
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	NB	SB	EB	WB	NB	SB	EB	WB
107	570	13	0	10	471	120	0	0	0	0	1	25	3	28	0	690	601	1	56	496	598	231	23

Percent Heavy Vehicles

0.0%	2.6%	0.0%	0.0%	0.0%	10.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.2%	8.0%	0.0%	0.0%	9.7%	2.5%	0.0%	0.0%

PHV- Bicycles

Northbound				Southbound				Eastbound				Westbound				
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum
0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1

PHV - Pedestrians

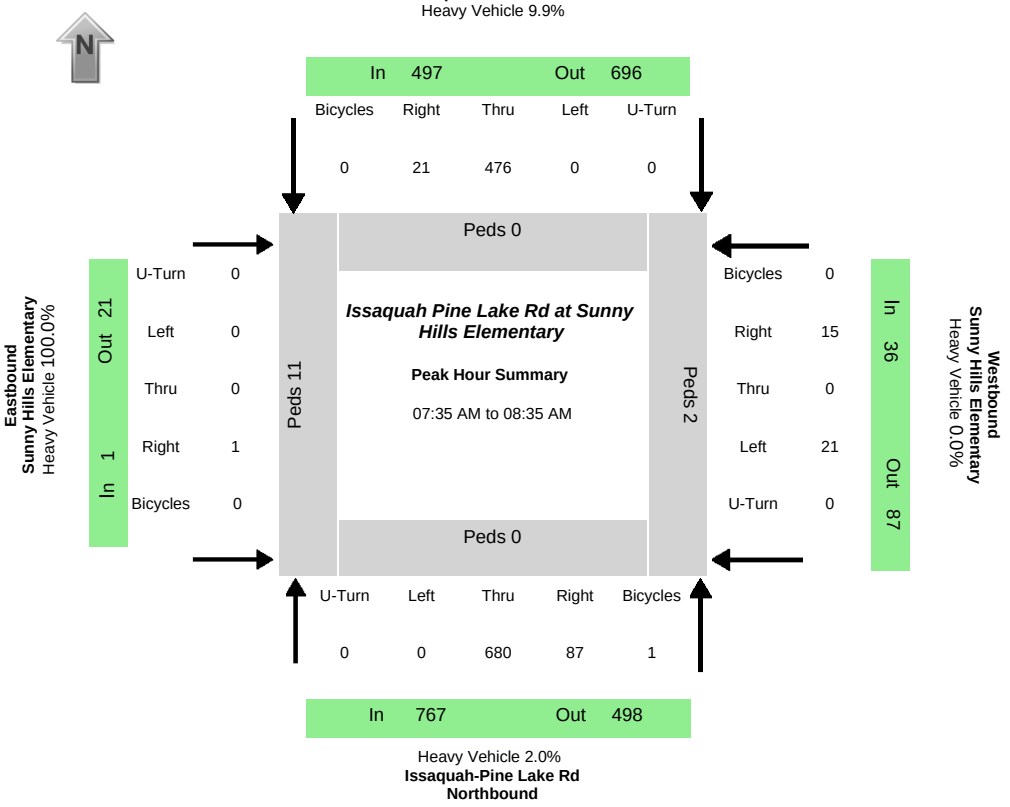
in Crosswalk				
NB	SB	EB	WB	Sum
112	3	1	3	119

All Vehicle Volumes

	Northbound Issaquah-Pine Lake Rd				Southbound Issaquah-Pine Lake Rd				Eastbound Pine Lake Middle School Dwy				Westbound 230th Ln SE				15 Min	1 HR
Time	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum	Sum
07:00:00 AM	1	40	1	0	1	23	1	0	0	0	0	0	5	0	1	0		
07:05:00 AM	2	40	2	0	0	45	1	0	0	0	1	0	1	0	3	0		
07:10:00 AM	1	43	0	0	1	28	0	0	0	0	0	0	2	0	7	0	250	
07:15:00 AM	3	34	0	0	0	34	1	0	0	0	0	0	4	0	2	0	255	
07:20:00 AM	2	44	1	0	0	26	0	0	0	0	0	0	1	0	0	0	234	
07:25:00 AM	2	40	0	0	2	35	2	0	0	0	0	0	5	0	4	0	242	
07:30:00 AM	1	40	0	0	0	22	5	0	0	0	0	0	2	0	7	0	241	
07:35:00 AM	4	60	1	0	0	28	3	0	0	0	0	0	2	0	2	0	267	
07:40:00 AM	12	56	1	0	1	39	8	0	0	0	0	0	3	0	1	0	298	
07:45:00 AM	19	57	0	0	0	44	22	0	0	0	0	1	0	0	0	0	364	
07:50:00 AM	17	43	4	0	0	40	16	0	0	0	0	0	1	1	4	0	390	
07:55:00 AM	22	46	3	0	0	37	15	0	0	0	0	0	7	1	2	0	402	1192
08:00:00 AM	18	42	2	0	2	45	23	0	0	0	0	0	0	1	2	0	394	1254
08:05:00 AM	11	38	1	0	1	45	21	0	0	0	0	0	3	0	5	0	393	1284
08:10:00 AM	1	45	1	0	0	43	4	0	0	0	0	0	0	0	1	0	355	1297
08:15:00 AM	1	40	0	0	3	32	4	0	0	0	0	0	4	0	2	0	306	1305
08:20:00 AM	0	53	0	0	2	32	2	0	0	0	0	0	4	0	1	0	275	1325
08:25:00 AM	1	47	0	0	1	45	2	0	0	0	0	0	0	0	5	0	281	1336
08:30:00 AM	1	43	0	0	0	41	0	0	0	0	0	0	1	0	3	0	284	1348
08:35:00 AM	0	39	0	0	1	39	0	0	0	0	0	0	1	0	5	0	275	1333
08:40:00 AM	2	55	0	0	0	41	0	0	0	0	0	0	1	0	4	0	277	1315
08:45:00 AM	0	62	0	0	0	40	2	0	0	0	0	0	2	0	2	0	296	1280
08:50:00 AM	1	44	1	0	2	57	1	0	0	0	0	0	2	0	4	0	323	1266
08:55:00 AM	0	61	1	0	0	38	0	0	0	0	0	0	5	0	2	0	327	1240

K-D-N
KEY DATA NETWORK

Data Provided by K-D-N.com 503-594-4224	
N/S street	*Issaquah-Pine Lake Rd*
E/W street	*Sunny Hills Elementary*
City, State	Samammish WA
Site Notes	
Location	47.579909 - -122.030087
Start Date	Thursday, May 17, 2018
Start Time	07:00:00 AM
Weather	
Study ID #	
Peak Hour Start	07:35:00 AM
Peak 15 Min Start	07:45:00 AM
PHF (15-Min Int)	0.84



Peak-Hour Volumes (PHV)

Northbound				Southbound				Eastbound				Westbound				Entering				Leaving			
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	NB	SB	EB	WB	NB	SB	EB	WB
0	680	87	0	0	476	21	0	0	0	1	0	21	0	15	0	767	497	1	36	498	695	21	87

Percent Heavy Vehicles

0.0%	2.2%	0.0%	0.0%	0.0%	5.9%	100.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.0%	9.9%	100.0%	0.0%	5.8%	2.2%	100.0%	0.0%

PHV- Bicycles

Northbound				Southbound				Eastbound				Westbound				
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum
0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1

PHV - Pedestrians

in Crosswalk				
NB	SB	EB	WB	Sum
0	0	11	2	13

All Vehicle Volumes

	Northbound Issaquah-Pine Lake Rd				Southbound Issaquah-Pine Lake Rd				Eastbound Sunny Hills Elementary				Westbound Sunny Hills Elementary				15 Min	1 HR
Time	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum	Sum
07:00:00 AM	0	49	2	0	0	28	2	0	0	0	0	0	0	0	1	0		
07:05:00 AM	0	44	2	0	0	46	3	0	0	0	0	0	0	0	0	0		
07:10:00 AM	0	39	3	0	0	26	2	0	0	0	0	0	0	0	2	0	249	
07:15:00 AM	0	45	4	0	0	39	1	0	0	0	0	0	2	0	0	0	258	
07:20:00 AM	0	40	1	0	0	33	0	0	0	0	1	0	1	0	2	0	241	
07:25:00 AM	0	41	0	0	0	42	0	1	0	0	0	0	0	0	0	0	253	
07:30:00 AM	0	44	3	0	0	28	1	0	0	0	0	0	0	0	0	0	238	
07:35:00 AM	0	68	4	0	0	28	1	0	0	0	0	0	0	0	1	0	262	
07:40:00 AM	0	66	2	0	0	40	2	0	0	0	1	0	0	0	3	0	292	
07:45:00 AM	0	80	2	0	0	39	4	0	0	0	0	0	0	0	1	0	342	
07:50:00 AM	0	72	7	0	0	39	7	0	0	0	0	0	1	0	0	0	366	
07:55:00 AM	0	69	8	0	0	56	2	0	0	0	0	0	1	0	1	0	389	1183
08:00:00 AM	0	54	5	0	0	41	3	0	0	0	0	0	3	0	0	0	369	1207
08:05:00 AM	0	47	14	0	0	46	1	0	0	0	0	0	2	0	2	0	355	1224
08:10:00 AM	0	40	8	0	0	32	0	0	0	0	0	0	6	0	2	0	306	1240
08:15:00 AM	0	48	10	0	0	32	0	0	0	0	0	0	2	0	3	0	295	1244
08:20:00 AM	0	42	5	0	0	44	0	0	0	0	0	0	3	0	1	0	278	1261
08:25:00 AM	0	52	9	0	0	42	1	0	0	0	0	0	0	0	0	0	294	1281
08:30:00 AM	0	42	13	0	0	37	0	0	0	0	0	0	3	0	1	0	295	1301
08:35:00 AM	0	37	3	0	0	45	2	0	0	0	0	0	1	0	0	0	288	1287
08:40:00 AM	0	60	7	0	0	42	0	0	0	0	0	0	1	0	0	0	294	1283
08:45:00 AM	0	60	9	0	0	32	2	0	0	0	0	0	1	0	1	0	303	1262
08:50:00 AM	0	46	19	0	0	63	2	0	0	0	0	0	8	0	5	0	358	1279
08:55:00 AM	0	48	25	0	0	43	0	0	0	0	0	0	4	0	11	0	379	1273

Study Name Issaquah Pine Lake Rd at 32nd Way
Start Date 05/17/2018
Start Time 7:00 AM
Site Code

Location 47.578935 -122.028155

	Northbound Approach Northbound				Southbound Approach Southbound				Eastbound Approach Eastbound				Westbound Approach Westbound			
Start Time	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn
7:00 AM	0	99	10	0	15	77	0	2	0	0	0	0	36	2	35	0
7:15 AM	0	94	18	0	27	81	1	0	3	0	1	0	37	1	37	0
7:30 AM	0	123	21	0	15	75	0	1	5	0	1	0	51	2	54	0
7:45 AM	1	145	15	1	24	106	0	2	3	0	1	0	49	0	84	0
8:00 AM	1	126	17	0	23	106	0	4	1	0	0	0	52	0	34	0
8:15 AM	0	110	12	0	19	99	0	6	3	0	2	0	36	0	47	0
8:30 AM	0	109	11	0	18	106	1	6	2	0	1	0	37	0	47	0
8:45 AM	0	155	33	4	28	111	1	12	2	0	2	0	47	0	55	0
4:00 PM	0	121	43	0	38	133	2	2	2	0	1	0	30	0	39	0
4:15 PM	2	95	33	1	48	145	0	0	1	0	2	0	29	0	44	0
4:30 PM	0	118	42	0	42	147	1	2	3	0	1	0	38	1	50	0
4:45 PM	1	141	53	4	53	144	2	0	0	0	1	0	30	0	31	0
5:00 PM	2	126	63	3	50	155	0	2	1	0	3	0	38	0	43	0
5:15 PM	2	129	60	0	56	144	0	1	1	0	0	0	42	0	34	0
5:30 PM	0	144	57	1	65	130	3	1	3	0	0	0	37	0	50	0
5:45 PM	3	127	63	3	66	148	5	3	1	0	1	0	31	0	35	0
8:00 AM	0%	0%	6%	0%	4%	3%	0%	0%	0%	0%	0%	0%	4%	0%	0%	0%
8:15 AM	0%	5%	0%	0%	11%	6%	0%	0%	0%	0%	0%	0%	6%	0%	0%	0%
8:30 AM	0%	6%	9%	0%	17%	5%	0%	0%	0%	0%	0%	0%	5%	0%	4%	0%
8:45 AM	0%	3%	12%	0%	0%	5%	0%	0%	0%	0%	0%	0%	2%	0%	2%	0%
			4%				5%				0%				3%	
5:00 PM	0%	2%	0%	0%	0%	2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
5:15 PM	0%	2%	2%	0%	2%	1%	0%	0%	0%	0%	0%	0%	5%	0%	0%	0%
5:30 PM	0%	1%	0%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%	2%	0%
5:45 PM	0%	3%	0%	0%	2%	2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
			1%				1%				0%				1%	

Key Data Network
K-D-N.com

Issaquah-Pine Lake Rd North of 37th Pl
Start: 5-15-18 7:00PM

Start	16-May-18	SB		NB		Combined		17-May	SB		NB		Combined	
Time	Wed	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	Thu	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.
12:00		11	87	10	96	21	183		10	104	7	95	17	199
12:15		4	99	11	98	15	197		7	91	10	107	17	198
12:30		6	81	4	82	10	163		5	95	2	100	7	195
12:45		4	102	4	87	8	189		1	98	3	100	4	198
01:00		3	111	3	108	6	219		0	97	3	87	3	184
01:15		2	111	1	107	3	218		3	103	2	82	5	185
01:30		1	133	2	103	3	236		3	96	2	80	5	176
01:45		0	90	6	108	6	198		2	107	1	100	3	207
02:00		5	117	1	94	6	211		2	110	2	89	4	199
02:15		2	89	2	88	4	177		2	95	5	98	7	193
02:30		1	108	4	108	5	216		3	102	3	151	6	253
02:45		2	104	4	138	6	242		2	139	2	140	4	279
03:00		4	120	4	119	8	239		3	184	1	129	4	313
03:15		2	154	0	129	2	283		2	163	2	136	4	299
03:30		1	***183***	2	135	3	318		2	152	6	131	8	283
03:45		5	***172***	2	144	7	316		7	180	4	150	11	330
04:00		2	***198***	6	125	8	323		7	164	7	143	14	307
04:15		3	***163***	0	131	3	294		5	173	6	143	11	316
04:30		6	158	4	158	10	316		14	***180***	6	165	20	345
04:45		16	181	8	177	24	358		12	***169***	6	178	18	***347***
05:00		15	168	14	167	29	335		15	***190***	13	***191***	28	***381***
05:15		14	189	13	***209***	27	***398***		8	***187***	18	***194***	26	***381***
05:30		32	146	28	***202***	60	***348***		26	171	21	***195***	47	***366***
05:45		37	164	33	***211***	70	***375***		30	154	30	***190***	60	344
06:00		39	171	38	***188***	77	***359***		36	156	38	153	74	309
06:15		73	132	58	175	131	307		70	147	55	155	125	302
06:30		92	147	74	208	166	355		89	172	61	166	150	338
06:45		96	134	90	159	186	293		95	129	101	138	196	267
07:00		108	119	98	114	206	233		109	114	105	132	214	246
07:15		116	133	127	116	243	249		129	102	113	105	242	207
07:30		124	106	106	107	230	213		118	108	148	93	266	201
07:45		126	98	127	106	253	204		141	125	162	91	303	216
08:00		103	90	111	88	214	178		158	151	135	102	293	253
08:15		113	97	***119***	92	232	189		137	80	***129***	75	***266***	155
08:30		***154***	81	***121***	73	***275***	154		***124***	82	***129***	70	***253***	152
08:45		***124***	83	***179***	64	***303***	147		***138***	85	***193***	68	***331***	153
09:00		***149***	70	***134***	79	***283***	149		***162***	79	***141***	81	***303***	160
09:15		***148***	70	103	56	***251***	126		***157***	65	105	68	262	133
09:30		146	57	108	50	254	107		112	40	112	56	224	96
09:45		90	41	154	42	244	83		87	34	82	41	169	75
10:00		134	35	91	28	225	63		79	21	92	38	171	59
10:15		128	13	75	42	203	55		76	15	74	42	150	57
10:30		96	18	79	29	175	47		111	22	73	29	184	51
10:45		89	12	90	17	179	29		83	13	74	17	157	30
11:00		119	15	79	19	198	34		106	10	71	14	177	24
11:15		99	10	75	12	174	22		73	14	75	18	148	32
11:30		91	4	109	16	200	20		90	5	83	11	173	16
11:45		115	15	115	8	230	23		95	8	94	15	189	23
Total		2850	4979	2626	5012	5476	9991		2746	5081	2607	4952	5353	10033
Day Total		7829		7638		15467			7827		7559		15386	
% Total		18.4%	32.2%	17.0%	32.4%				17.8%	33.0%	16.9%	32.2%		
Peak	-	08:30	03:30	08:15	05:15	08:30	05:15	-	08:30	04:30	08:15	05:00	08:15	04:45
Vol.	-	575	716	553	810	1112	1480	-	581	726	592	770	1153	1475
P.H.F.		0.933	0.904	0.772	0.960	0.917	0.930		0.897	0.955	0.767	0.987	0.871	0.968

ADT	ADT 15,426	AADT 15,426

Key Data Network
K-D-N.com

Issaquah-Pine Lake Rd North of Klahanie
Start: 5-15-18 7:00PM

Start	16-May-18	NB		SB		Combined		17-May	NB		SB		Combined	
Time	Wed	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	Thu	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.
12:00		17	92	12	93	29	185		6	94	11	95	17	189
12:15		12	104	4	82	16	186		13	119	4	95	17	214
12:30		5	87	6	94	11	181		2	95	4	103	6	198
12:45		4	88	3	101	7	189		6	136	1	95	7	231
01:00		3	118	2	112	5	230		3	98	1	115	4	213
01:15		1	106	2	102	3	208		3	88	2	122	5	210
01:30		3	99	1	138	4	237		2	82	3	95	5	177
01:45		5	112	0	99	5	211		2	99	2	99	4	198
02:00		3	99	5	119	8	218		5	100	3	107	8	207
02:15		2	92	2	101	4	193		5	114	2	93	7	207
02:30		4	115	1	118	5	233		2	132	3	104	5	236
02:45		4	128	2	115	6	243		2	124	3	139	5	263
03:00		5	113	3	111	8	224		1	138	3	147	4	285
03:15		0	130	1	133	1	263		2	133	2	165	4	298
03:30		1	140	4	***178***	5	318		7	144	2	161	9	305
03:45		3	139	4	***168***	7	307		3	159	7	191	10	350
04:00		6	135	4	***191***	10	326		6	150	7	153	13	303
04:15		0	147	6	***170***	6	317		6	142	7	***172***	13	314
04:30		5	171	10	155	15	326		5	173	13	***168***	18	341
04:45		8	170	17	164	25	334		6	185	18	***172***	24	***357***
05:00		8	172	17	155	25	327		12	***207***	17	***181***	29	***388***
05:15		12	***218***	22	169	34	***387***		18	***207***	17	165	35	***372***
05:30		27	***207***	38	148	65	***355***		19	***196***	28	159	47	***355***
05:45		37	***224***	45	155	82	***379***		31	***192***	39	162	70	354
06:00		34	***191***	45	152	79	***343***		35	165	43	149	78	314
06:15		49	168	84	115	133	283		46	164	83	134	129	298
06:30		71	207	113	131	184	338		59	177	106	172	165	349
06:45		93	165	125	128	218	293		91	152	112	123	203	275
07:00		84	114	129	115	213	229		83	128	128	116	211	244
07:15		112	136	133	113	245	249		95	115	139	111	234	226
07:30		91	121	133	104	224	225		126	92	131	95	257	187
07:45		109	93	152	86	261	179		106	96	171	101	277	197
08:00		98	102	121	83	219	185		112	114	159	149	271	263
08:15		***108***	107	137	93	245	200		***121***	75	141	75	262	150
08:30		***113***	82	***146***	79	***259***	161		***132***	81	***160***	78	***292***	159
08:45		***155***	69	***153***	74	***308***	143		***169***	80	***154***	66	***323***	146
09:00		***108***	101	***163***	67	***271***	168		***120***	91	***180***	75	***300***	166
09:15		95	61	***154***	64	***249***	125		108	76	***176***	61	***284***	137
09:30		99	63	133	59	232	122		107	70	134	38	241	108
09:45		123	49	103	34	226	83		73	45	112	28	185	73
10:00		82	35	122	33	204	68		78	42	85	18	163	60
10:15		70	45	129	15	199	60		78	42	81	13	159	55
10:30		78	38	110	19	188	57		69	34	117	15	186	49
10:45		92	22	81	10	173	32		79	18	87	14	166	32
11:00		84	21	119	13	203	34		73	17	113	10	186	27
11:15		71	16	100	8	171	24		70	17	83	13	153	30
11:30		91	17	119	4	210	21		81	15	101	8	182	23
11:45		104	10	131	16	235	26		109	14	94	5	203	19
Total		2389	5239	3146	4786	5535	10025		2387	5227	3089	4925	5476	10152
Day Total		7628		7932		15560			7614		8014		15628	
% Total		15.4%	33.7%	20.2%	30.8%				15.3%	33.4%	19.8%	31.5%		
Peak	-	08:15	05:15	08:30	03:30	08:30	05:15	-	08:15	05:00	08:30	04:15	08:30	04:45
Vol.	-	484	840	616	707	1087	1464	-	542	802	670	693	1199	1472
P.H.F.		0.781	0.938	0.945	0.925	0.882	0.946		0.802	0.969	0.931	0.957	0.928	0.948

ADT	ADT 15,594	AADT 15,594

Jed Ireland
City of Sammamish Dept. of Public Works
November 12, 2018

APPENDIX B:

Signal Warrant

Traffic Signal Warrant Summary Worksheet

The Worksheet(s) attached are provided as an attachment to the Engineering Investigation Study for:

Intersection: Issaquah Pine Lake Road @ SE 37th Pl
County: King
City: Sammamish

Major Street: Issaquah Pine Lake Road
Critical Approach Speed: 45 mph
Lanes: 1 lane

Minor Street: SE 37th Pl
Critical Approach Speed: 25 mph
Lanes: 1 lane

% Right Turns Included
From North (SB) 100%
From East (WB) 100%
From South (NB) 100%
From West (EB) 100%

In built-up area of isolated community of < 10,000 population? No
Total number of approaches at intersection? 3
If it is a "T" intersection, inflate minor threshold to 150%? No
Manually set volume level? No

Analysis based on EXISTING volume data.

Date	Day of the Week	Time (HH:MM)			
		From	AM / PM	To	AM / PM
18-May-18	Thursday	7:00	AM	6:00	PM

*No weekend data was collected

Warrant Evaluation Summary	Warrant Met:
Warrant 1: Eight - Hour Vehicular Volume	**N/A**
Condition A: Minimum Vehicular Volume	
Condition B: Interruption of Continuous Traffic	
Condition C: Combination: 80% of A and B	
Warrant 2: Four-Hour Volume	**Yes**
Warrant 3: Peak Hour Volume	**Yes**
Warrant 4: Pedestrian Volume	**No**
Criterion A: Four-Hour	No
Criterion B: Peak-Hour	No
Warrant 5: School Crossing	**No**
Warrant 6: Coordinated Signal System	**N/A**
Warrant 7: Crash Experience	**N/A**
Warrant 8: Roadway Network	**No**
Warrant 9: Intersection Near a Grade Crossing	**N/A**

Warrant Analysis Conducted By:

Name: Josh Anderson, PE, PTOE
Agency: David Evans and Associates, Inc.
Date: 7/30/2018

Warrant 1: Eight - Hour Vehicular Volume 70%

Warrant Evaluated? No **Warrant Satisfied? N/A** **Manually Set To:**

Condition A : Min. Veh. Volume		
Volume Level	70%	56%
Major Rd. Req	350	280
Minor Rd. Req	105	84
Number of Hours	2	2
		Satisfied?

Condition B: Interruption of Continuous Traffic		
Volume Level	70%	56%
Major Rd. Req	525	420
Minor Rd. Req	53	42
Number of Hours	4	4
		Satisfied?

Condition C: Combination of A & B at 56%
Satisfied?

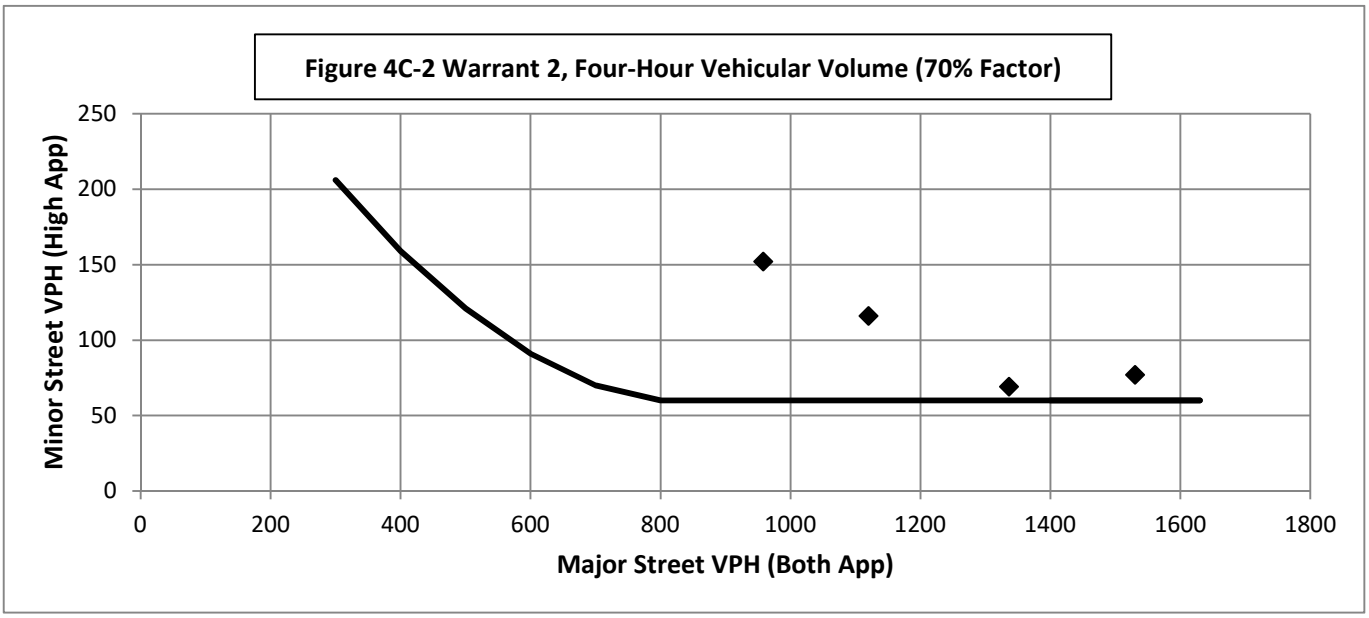
6:00 AM Enter Start Time (Military Time) (HH:MM)

Time Period	From	To	Major Road: Both App. (VPH)	Minor Road: High App. (VPH)	Total
1	6:00	7:00	0	0	0
2	7:00	8:00	958	152	1110
3	8:00	9:00	1120	116	1236
4	9:00	10:00	0	0	0
5	10:00	11:00	0	0	0
6	11:00	12:00	0	0	0
7	12:00	13:00	0	0	0
8	13:00	14:00	0	0	0
9	14:00	15:00	0	0	0
10	15:00	16:00	0	0	0
11	16:00	17:00	1336	69	1405
12	17:00	18:00	1530	77	1607
13	18:00	19:00	0	0	0
14	19:00	20:00	0	0	0
15	20:00	21:00	0	0	0
16	21:00	22:00	0	0	0

Warrant 2: Four-Hour Volume 70%

Warrant Evaluated? Yes
Warrant Satisfied? Yes
Manually Set To:

Hour Start	17:00	16:00	8:00	7:00
Major Road Vol.	1530	1336	1120	958
Minor Road Vol.	77	69	116	152



Warrant 3: Peak Hour Volume 70%

Warrant Evaluated? Yes **Warrant Satisfied? Yes** **Manually Set To:**

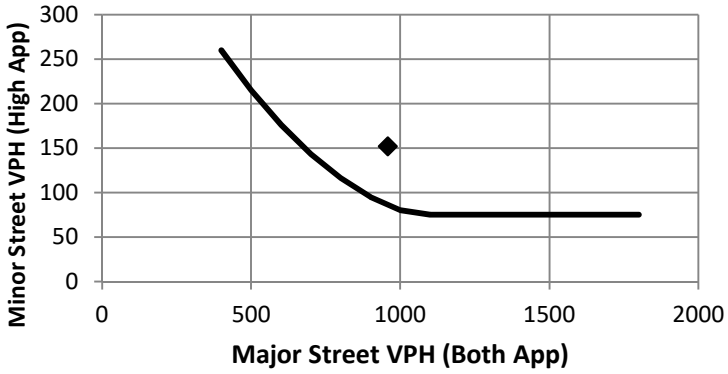
Condition justifying use of warrant:

Criteria		Met?
Delay on Minor Approach	4	No
Volume on Minor Approach	100	Yes
Total Entering Volume (veh/h)	650	

Manually Set Peak Hour? Yes

Peak Hour	Major Road Vol. (Both App.)	Minor Road Vol. (High App.)
7:00	958	152
7:00	958	152

Figure 4C-4 Warrant 3, Peak Hour (70% Factor)



Warrant 4: Pedestrian Volume 70%

Warrant Evaluated? Yes **Warrant Satisfied? No** **Manually Set To:**

Criterion A: Four Hour

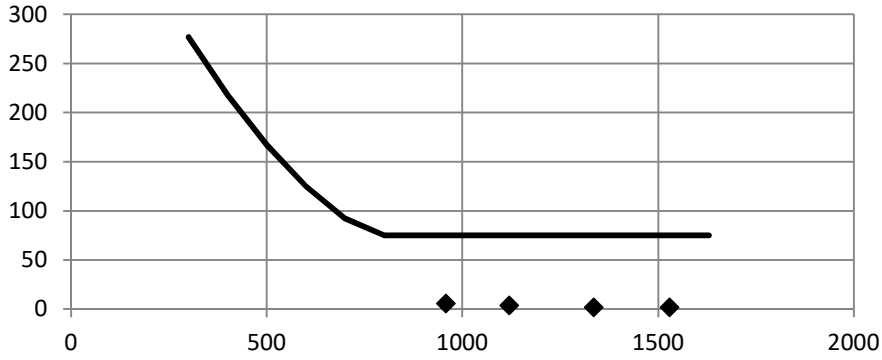
Hour (Start)	Pedestrian Volume	Major Road Vol.
7:00	6	958
8:00	4	1120
16:00	2	1336
17:00	2	1530

Manually Set Major Rd Vol? No

Avg. walk speed less than 3.5 ft/s? No

Criterion A Satisfied? No

Figure 4C-6 Warrant 4, Pedestrian Four-Hour Volume (70% Factor)

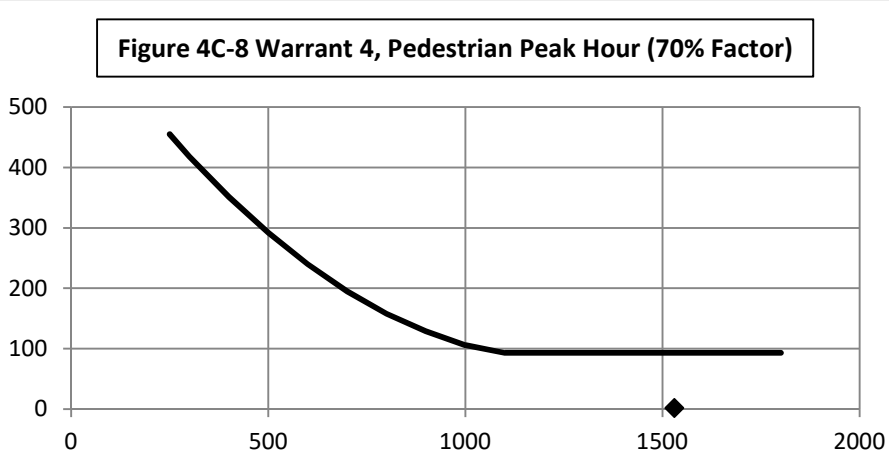


Criterion B: Peak Hour

Peak Hour	Pedestrian Vol.	Major Road Vol.
17:00	2	1530

Criterion B Satisfied? No

Figure 4C-8 Warrant 4, Pedestrian Peak Hour (70% Factor)



Warrant 5: School Crossing 70%

Warrant Evaluated? Yes **Warrant Satisfied? No** **Manually Set To:**

Criteria		Fulfilled?
1	There are a MINIMUM of 20 school children during the highest crossing hour.	No
2	There are fewer adequate gaps in the major road traffic stream during the period when the school children are using the crossing than the number of minutes in the same period.	No
3	The nearest traffic signal along the major road is located more than 300 ft away. Or, the nearest traffic signal is within 300 ft but the proposed traffic signal will not restrict the progressive movement of traffic.	Yes

Warrant 6: Coordinated Signal System 70%

Warrant Evaluated? Yes **Warrant Satisfied? N/A** **Manually Set To:**

Criteria		Fulfilled?
1	Signal spacing > 1000 ft	No
2	On a one-way road or a road that has traffic predominantly in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.	No
3	On a two-way road, adjacent signals do not provide the necessary degree of platooning and the proposed and the adjacent signals will collectively provide a progressive operation.	No

Warrant 7: Crash Experience 70%

Warrant Evaluated? No **Warrant Satisfied? N/A** **Manually Set To:**

Criteria			Met?	Fulfilled?
1	Adequate trial of other remedial measures has failed to reduce crash frequency.			No
	Measures Tried:	None		
2	Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12 month period.	# of crashes per 12 months		No
		3		
3	Warrant 1, Condition A (80%)		No	No
	Warrant 1, Condition B (80%)		No	
	Warrant 4, Criterion A (80%)		No	
	Warrant 4, Criterion B (80%)		No	

Warrant 8: Roadway Network 70%

Warrant Evaluated? Yes **Warrant Satisfied? No** **Manually Set To:**

Criteria						Met?	Fulfilled?
1	Total entering volume of at least 1,000 veh/h during typical weekday peak hour				1110	Yes	No
	Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.					No	
2	Total entering vol. of at least 1,000 veh/h for each of any 5 hrs of non-normal business day (Sat. or Sun.)						No
	Hour	0:00	0:00	0:00	0:00	0:00	
	Volume	0	0	0	0	0	

Characteristics of Major Routes - Select yes if all intersecting routes have characteristic		Fulfilled?
1	Part of the road or highway system that serves as the principal roadway network for through traffic flow	Yes
2	Rural or suburban highway outside of, entering, or traversing a city	No
3	Appears as a major route on an official plan	Yes

Warrant 9: Intersection Near a Grade Crossing 70%

Warrant Evaluated? No **Warrant Satisfied? N/A** **Manually Set To:**

Adjustment Factors			Manually Set Peak Hour?				
Rail Traffic per Day	% High Occupancy Buses on Minor Road	% Tractor-Trailer Trucks on Minor Road	D	Peak Hour	Major Road Vol.	Minor Road Vol.	Adjusted Minor Vol.
1	0	0% to 2.5%	660	7:00	958	152	50.92

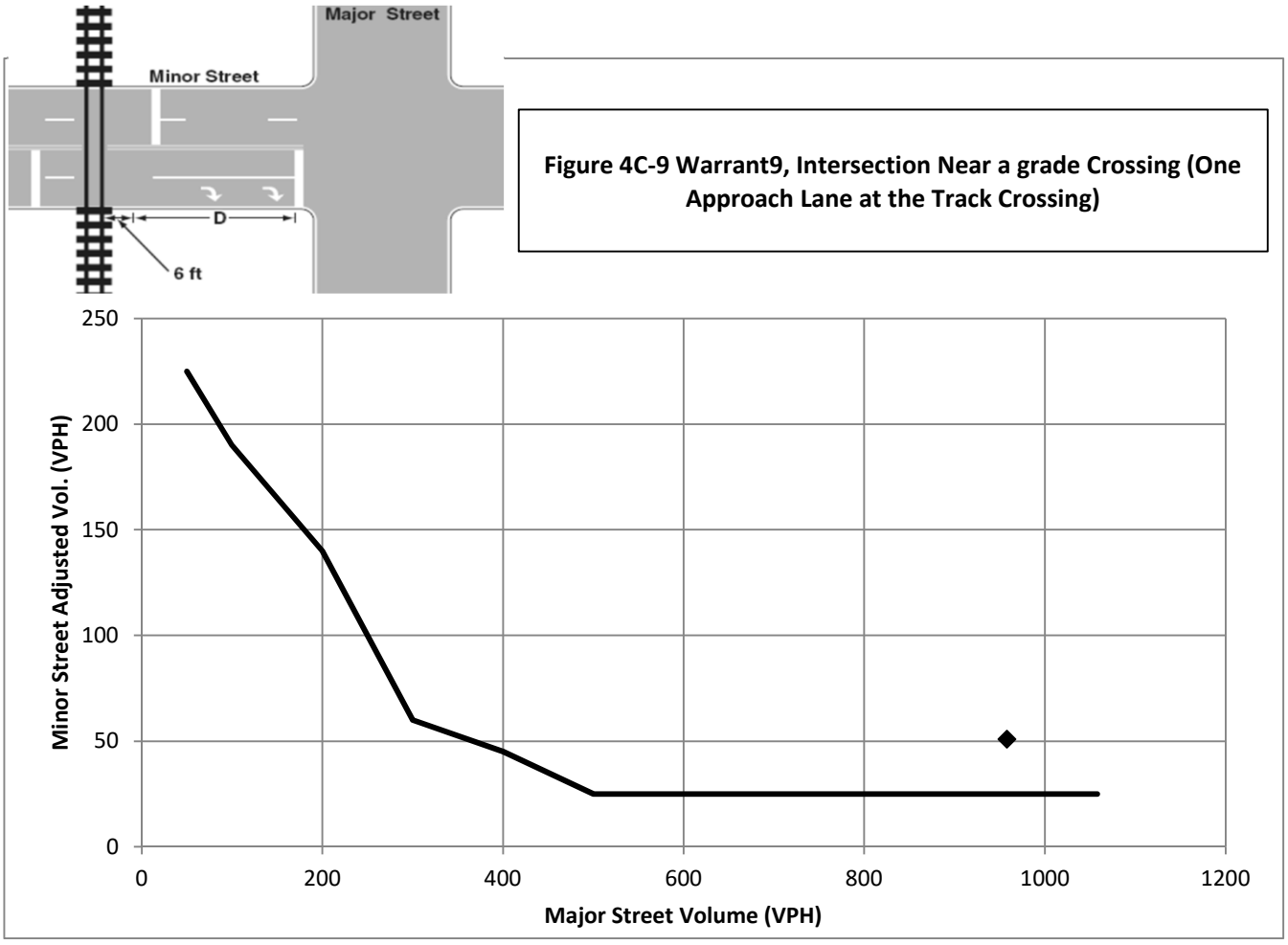


Figure 4C-9 Warrant9, Intersection Near a grade Crossing (One Approach Lane at the Track Crossing)

Conclusions/Comments:

This analysis was completed using the following assumptions:

-The major-street speed is in excess of 40 mph and the intersection is in an isolated community with a population of less than 10,000 (70% warrants)

-2016 and 2017 crash data not available

-No significant imminent developments planned on study area roadways

NOTE - Warrants would not be met under the following conditions:

-100% warrants evaluated

-Minor street threshold inflated 150% due to "T" intersection configuration

Updated: 2/18/2016

Traffic Signal Warrant Summary Worksheet

The Worksheet(s) attached are provided as an attachment to the Engineering Investigation Study for:

Intersection: Issaquah Pine Lake Road @ SE 37th Pl
County: King
City: Sammamish

Major Street: Issaquah Pine Lake Road
Critical Approach Speed: 45 mph
Lanes: 1 lane

Minor Street: SE 37th Pl
Critical Approach Speed: 25 mph
Lanes: 1 lane

% Right Turns Included
From North (SB) 100%
From East (WB) 100%
From South (NB) 100%
From West (EB) 100%

In built-up area of isolated community of < 10,000 population? No
Total number of approaches at intersection? 3
If it is a "T" intersection, inflate minor threshold to 150%? No
Manually set volume level? No

Analysis based on PROJECTED volume data.

Forecast Year	Within 5 Years of Construction?	Time (HH:MM)			
		From	AM / PM	To	AM / PM
18-May-35	No	7:00	AM	6:00	PM

*No weekend data was collected

Warrant Evaluation Summary	Warrant Met:
Warrant 1: Eight - Hour Vehicular Volume	**N/A**
Condition A: Minimum Vehicular Volume	
Condition B: Interruption of Continuous Traffic	
Condition C: Combination: 80% of A and B	
Warrant 2: Four-Hour Volume	**Yes**
Warrant 3: Peak Hour Volume	**Yes**
Warrant 4: Pedestrian Volume	**No**
Criterion A: Four-Hour	No
Criterion B: Peak-Hour	No
Warrant 5: School Crossing	**No**
Warrant 6: Coordinated Signal System	**N/A**
Warrant 7: Crash Experience	**N/A**
Warrant 8: Roadway Network	**No**
Warrant 9: Intersection Near a Grade Crossing	**N/A**

Warrant Analysis Conducted By:

Name: Josh Anderson, PE, PTOE
Agency: David Evans and Associates, Inc.
Date: 7/30/2018

Warrant 1: Eight - Hour Vehicular Volume 70%

Warrant Evaluated? No **Warrant Satisfied? N/A** **Manually Set To:**

Condition A : Min. Veh. Volume		
Volume Level	70%	56%
Major Rd. Req	350	280
Minor Rd. Req	105	84
Number of Hours	2	2
		Satisfied?

Condition B: Interruption of Continuous Traffic		
Volume Level	70%	56%
Major Rd. Req	525	420
Minor Rd. Req	53	42
Number of Hours	4	4
		Satisfied?

Condition C: Combination of A & B at 56%
Satisfied?

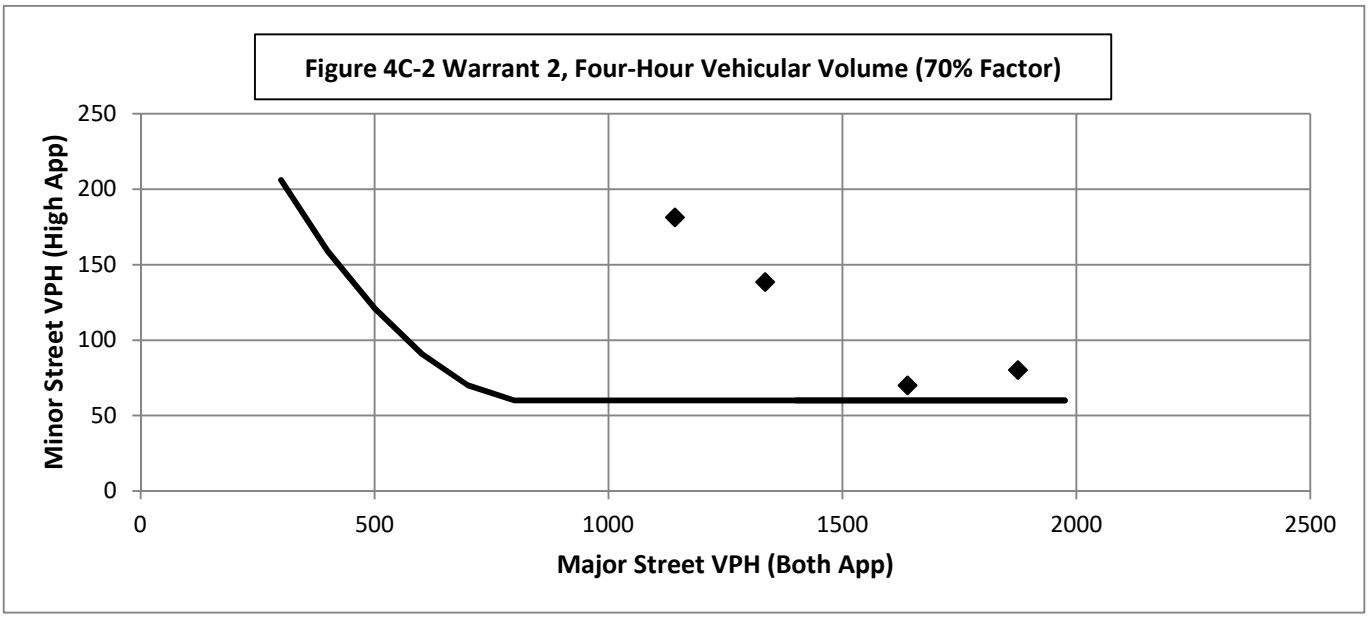
6:00 AM Enter Start Time (Military Time) (HH:MM)

Time Period	From	To	Major Road: Both App. (VPH)	Minor Road: High App. (VPH)	Total
1	6:00	7:00	0	0	0
2	7:00	8:00	1142	181	1322.99
3	8:00	9:00	1335	138	1473.16
4	9:00	10:00	0	0	0
5	10:00	11:00	0	0	0
6	11:00	12:00	0	0	0
7	12:00	13:00	0	0	0
8	13:00	14:00	0	0	0
9	14:00	15:00	0	0	0
10	15:00	16:00	0	0	0
11	16:00	17:00	1639	70	1709.26
12	17:00	18:00	1875	80	1955
13	18:00	19:00	0	0	0
14	19:00	20:00	0	0	0
15	20:00	21:00	0	0	0
16	21:00	22:00	0	0	0

Warrant 2: Four-Hour Volume 70%

Warrant Evaluated? Yes
Warrant Satisfied? Yes
Manually Set To:

Hour Start	17:00	16:00	8:00	7:00
Major Road Vol.	1875	1639.31	1334.91	1141.82
Minor Road Vol.	80	69.944	138.258	181.166



Warrant 3: Peak Hour Volume 70%

Warrant Evaluated? Yes **Warrant Satisfied? Yes** **Manually Set To:**

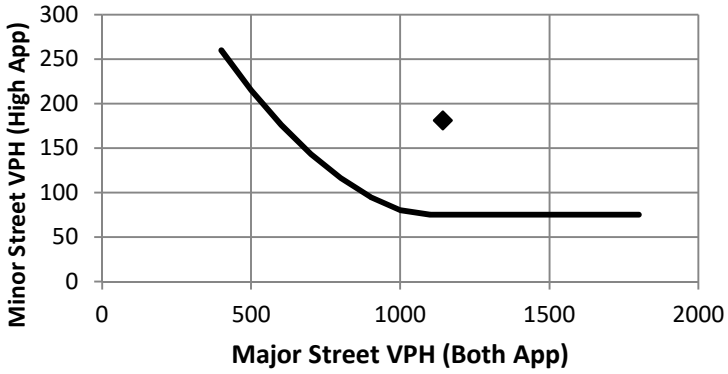
Condition justifying use of warrant:

Criteria		Met?
Delay on Minor Approach	4	No
Volume on Minor Approach	100	Yes
Total Entering Volume (veh/h)	650	

Manually Set Peak Hour? Yes

Peak Hour	Major Road Vol. (Both App.)	Minor Road Vol. (High App.)
7:00	1142	181
7:00	1142	181

Figure 4C-4 Warrant 3, Peak Hour (70% Factor)



Warrant 4: Pedestrian Volume 70%

Warrant Evaluated? Yes **Warrant Satisfied? No** **Manually Set To:**

Criterion A: Four Hour

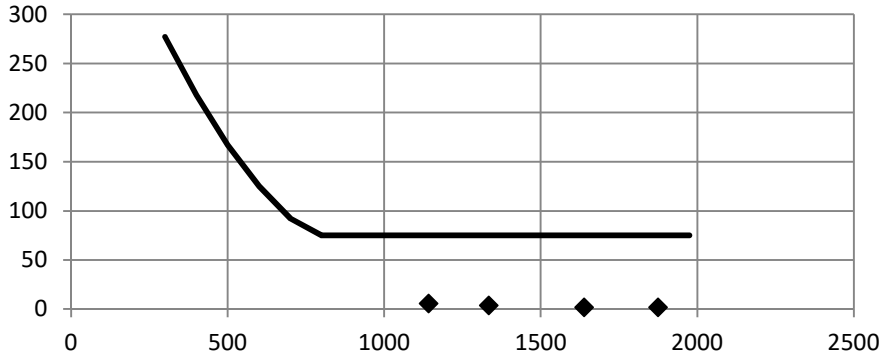
Hour (Start)	Pedestrian Volume	Major Road Vol.
7:00	6	1141.8206
8:00	4	1334.905
16:00	2	1639.3124
17:00	2	1875

Manually Set Major Rd Vol? No

Avg. walk speed less than 3.5 ft/s? No

Criterion A Satisfied? No

Figure 4C-6 Warrant 4, Pedestrian Four-Hour Volume (70% Factor)

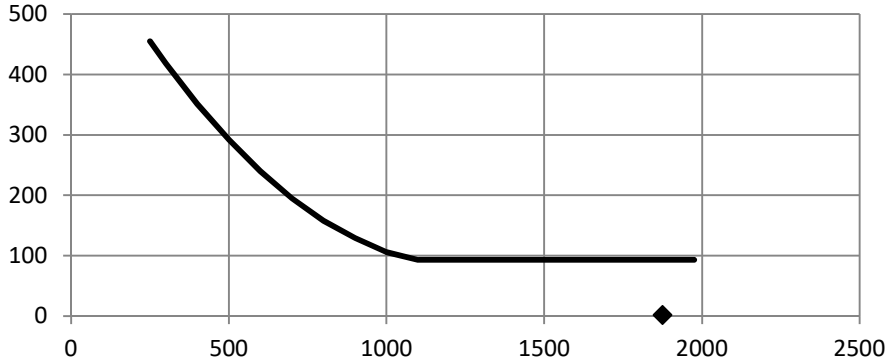


Criterion B: Peak Hour

Peak Hour	Pedestrian Vol.	Major Road Vol.
17:00	2	1875

Criterion B Satisfied? No

Figure 4C-8 Warrant 4, Pedestrian Peak Hour (70% Factor)



Warrant 5: School Crossing 70%

Warrant Evaluated? Yes **Warrant Satisfied? No** **Manually Set To:**

Criteria		Fulfilled?
1	There are a MINIMUM of 20 school children during the highest crossing hour.	No
2	There are fewer adequate gaps in the major road traffic stream during the period when the school children are using the crossing than the number of minutes in the same period.	No
3	The nearest traffic signal along the major road is located more than 300 ft away. Or, the nearest traffic signal is within 300 ft but the proposed traffic signal will not restrict the progressive movement of traffic.	Yes

Warrant 6: Coordinated Signal System 70%

Warrant Evaluated? Yes **Warrant Satisfied? N/A** **Manually Set To:**

Criteria		Fulfilled?
1	Signal spacing > 1000 ft	No
2	On a one-way road or a road that has traffic predominantly in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.	No
3	On a two-way road, adjacent signals do not provide the necessary degree of platooning and the proposed and the adjacent signals will collectively provide a progressive operation.	No

Warrant 7: Crash Experience 70%

Warrant Evaluated? No **Warrant Satisfied? N/A** **Manually Set To:**

Criteria			Met?	Fulfilled?
1	Adequate trial of other remedial measures has failed to reduce crash frequency.			No
	Measures Tried:	None		
2	Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12 month period.	# of crashes per 12 months		No
		3		
3	Warrant 1, Condition A (80%)		No	No
	Warrant 1, Condition B (80%)		No	
	Warrant 4, Criterion A (80%)		No	
	Warrant 4, Criterion B (80%)		No	

Warrant 8: Roadway Network 70%

Warrant Evaluated? Yes **Warrant Satisfied? No** **Manually Set To:**

Criteria						Met?	Fulfilled?
1	Total entering volume of at least 1,000 veh/h during typical weekday peak hour				1323	Yes	No
	Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.					No	
2	Total entering vol. of at least 1,000 veh/h for each of any 5 hrs of non-normal business day (Sat. or Sun.)						No
	Hour	0:00	0:00	0:00	0:00	0:00	
	Volume	0	0	0	0	0	

Characteristics of Major Routes - Select yes if all intersecting routes have characteristic		Fulfilled?
1	Part of the road or highway system that serves as the principal roadway network for through traffic flow	Yes
2	Rural or suburban highway outside of, entering, or traversing a city	No
3	Appears as a major route on an official plan	Yes

Warrant 9: Intersection Near a Grade Crossing 70%

Warrant Evaluated? No **Warrant Satisfied? N/A** **Manually Set To:**

Adjustment Factors			Manually Set Peak Hour?				
Rail Traffic per Day	% High Occupancy Buses on Minor Road	% Tractor-Trailer Trucks on Minor Road	D	Peak Hour	Major Road Vol.	Minor Road Vol.	Adjusted Minor Vol.
1	0	0% to 2.5%	660	7:00	1142	181	60.635

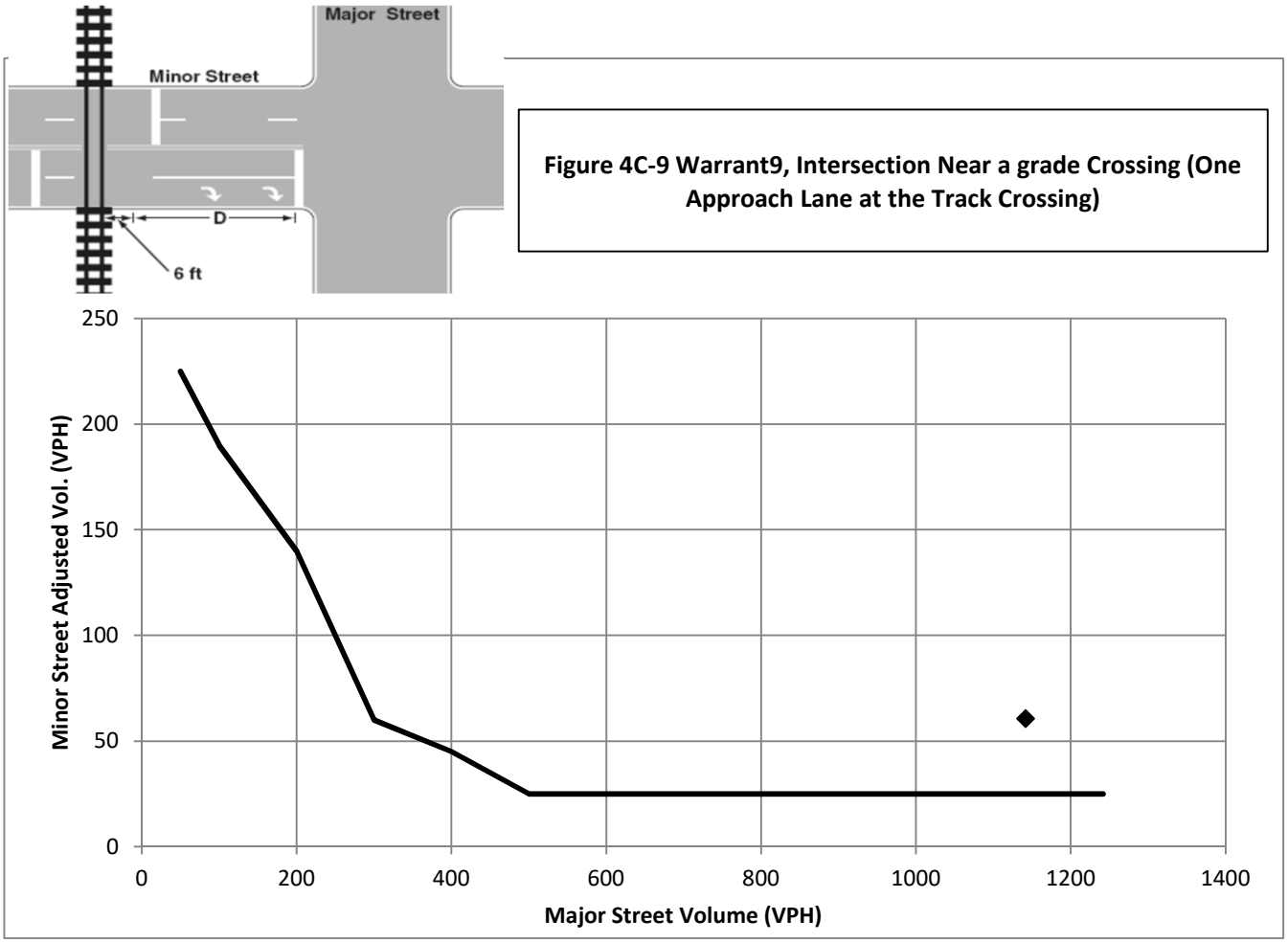


Figure 4C-9 Warrant9, Intersection Near a grade Crossing (One Approach Lane at the Track Crossing)

Conclusions/Comments:

This analysis was completed using the following assumptions:

-The major-street speed is in excess of 40 mph and the intersection is in an isolated community with a population of less than 10,000 (70% warrants)

-2016 and 2017 crash data not available

-No significant imminent developments planned on study area roadways

NOTE - Warrants would not be met under the following conditions:

-100% warrants evaluated

-Minor street threshold inflated 150% due to "T" intersection configuration

Updated: 2/18/2016